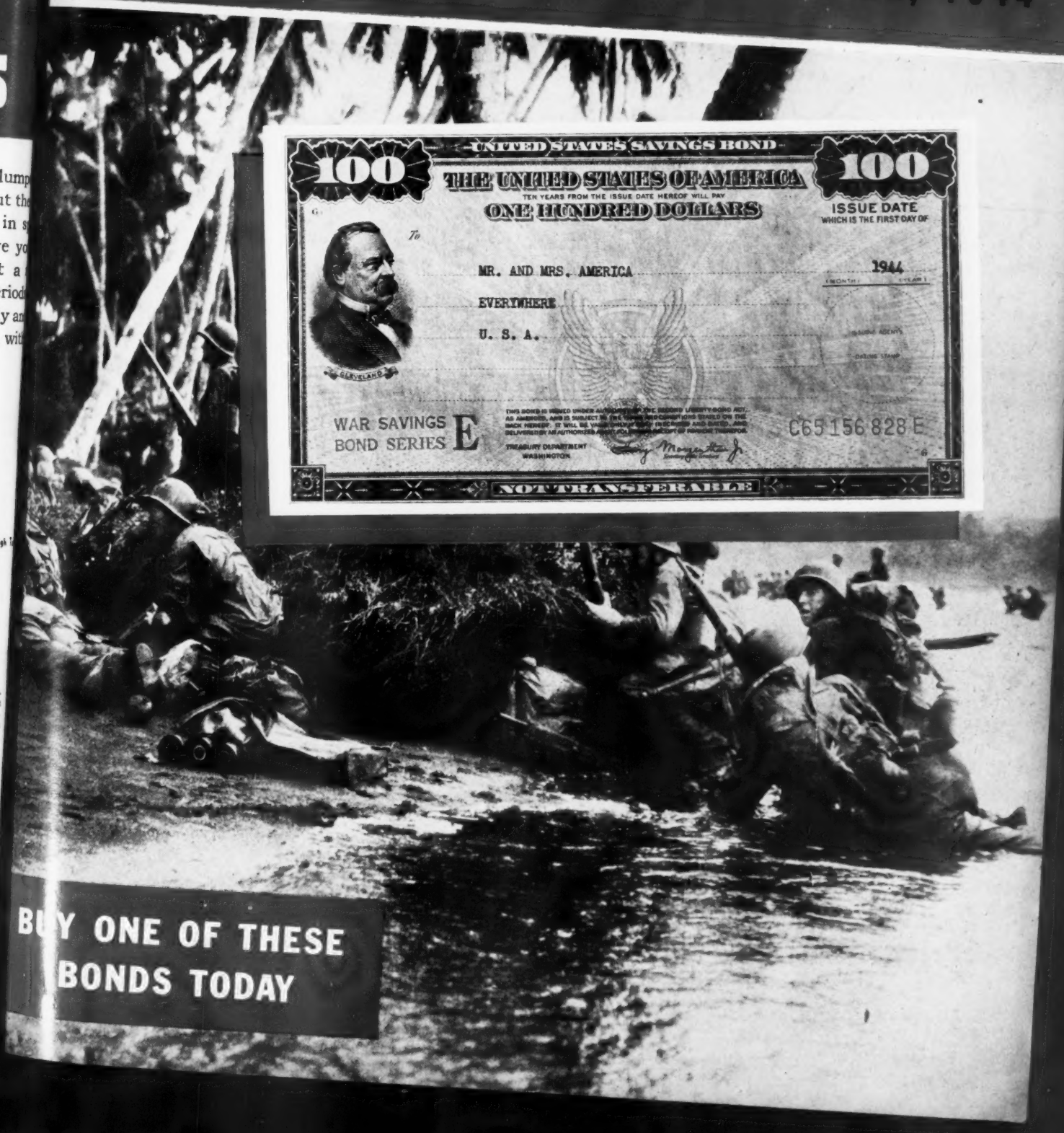
Coal Age

JUNE, 1944



More Tons per KW... savings up 20%

SUN MINE LUBRICANTS

Cut Power Drag . . . Reduce Cost of Lubrication

Faulty lubrication of mine car wheels can slow production . . . waste power . . . time . . . and money. The right lubricant in the right place can do much toward increasing the total output of any mine. Here's one example . . .

POWER DRAG SLOWED CARS to almost a standstill on a 15% grade. This happened again and again . . . slowing production and eating up time and labor far too rapidly. A Sun Engineer was asked to study this condition and suggest a remedy.

GREASE SEPARATION AND HARDENING was found to be the real cause, building up a hard cake of soap which acted as a drag on each bearing. A change to Sun Mine Car Grease has completely overcome this problem because it does not separate under normal conditions. In the 15 months since the switch there has been no recurrence of "drag" and no loss of time for frequent regreasing. As a plus advantage there has been an actual cash saving of 20% in lubrication costs.

CHECK WASTE NOW in your mine with proper lubrication. The new Sun "Save and Serve" plan for proper lubrication is available to you without cost or obligation. It includes lubrication handbook maintenance wall chart, technical bulletins, posters, etc. Write for folder describing plan and how you can obtain samples.

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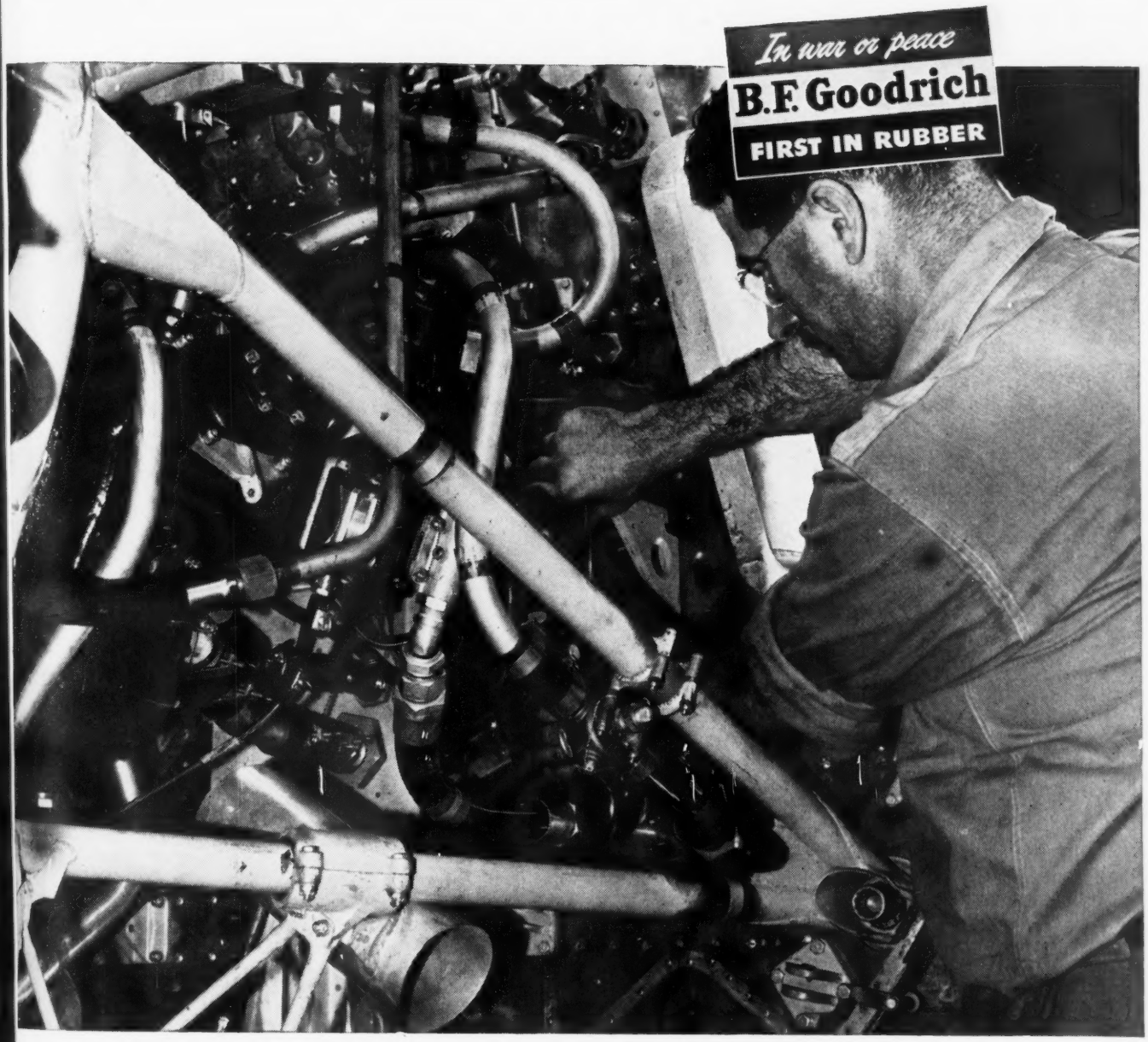
SAVE and SERVE
WITH PROPER LUBRICATION

SUN INDUSTRIAL PRODUCTS

HELPING INDUSTRY HELP AMERICA



Streams of oil make muscles for airplanes

A typical example of B. F. Goodrich development in rubber

SOME airplanes are so big it takes hundreds of pounds of pressure to move the wing flaps, landing gear and brakes. It's done by hydraulic systems, in which the power flows through streams of oil in pipe and hose. But if the hose is shot or damaged, the control won't work and men's lives may be endangered. Attaching couplings to new hose took giant presses, and they can't have those on every jungle airport.

Then, new couplings were developed which could be attached in the field. But the couplings wouldn't work. The rubber in the hose would stretch or "flow" when squeezed between the parts of the coupling — then sudden pressure in the hose would loosen the coupling.

B. F. Goodrich engineers were asked for a hose to make these couplings practical. They designed a hose that had no layers of rubber outside or between the cord layers. Instead they forced the protecting rubber down into the fibers of the cord as it was braided around the inner tube. There was no free rubber to "flow" — the jaws of the coupling bit into hard rubberized cords only, and held.

This new hose was the first cotton braided hose ever made that would stand the high pressures — as strong as wire braided hose formerly used, and much lighter. It's already on thousands of planes — another case where a B. F. Goodrich development has made some other development practical. *The B. F. Goodrich Co., Industrial Products Division, Akron, O.*

B.F. Goodrich

RUBBER *and* SYNTHETIC *products*

TO DO ONE THING

— and do it supremely well . . .

ONE hundred and four years ago Henry Disston set to work, in a cellar in Philadelphia, to make better saws than any European manufacturer. Today, men the world over acknowledge the superiority of Disston Saws—one of the many famous Quality Products of Philadelphia.

TWENTY-FIVE years ago Hulburt, of Philadelphia, began to make quality lubricating grease for one use only—*the better lubrication of coal mine equipment.* How well Hulburt succeeded is reflected in the reputation for supreme quality established by Hulburt Grease throughout the Coal industry.

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Specialists in Coal Mine Lubrication

HULBURT *Quality* GREASE

HOUR AFTER HOUR PHILCO MINE LOCOMOTIVE BATTERIES DELIVER

HIGH VOLTAGE

PHILCO Mine Locomotive Batteries pack an *extra wallop* not only when they're fresh from the charging racks, but throughout the entire working day. That's because Philco Batteries are engineered to deliver *high voltage* and keep right on delivering it hour after hour.

It's this sustained high voltage you get in a Philco that hauls more tons per shift . . . cuts haulage costs per ton . . . keeps the pit cars going at top speed. There's maximum capacity in a Philco, too—coupled with long productive life. Together these Philco features add up to the best battery you can buy for today's mining service.

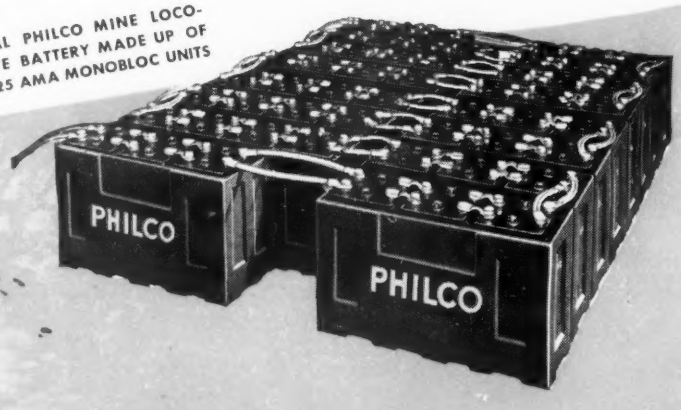
For new equipment or replacements, get the facts on Philco Mine Locomotive Batteries!

Philco Corporation, Storage Battery Division, Trenton 7, N.J.

Specify

PHILCO MINE BATTERIES

TYPICAL PHILCO MINE LOCOMOTIVE BATTERY MADE UP OF TYPE 25 AMA MONOBLOC UNITS



Coal Age

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CONTENTS

Volume 49 — **JUNE, 1944** — *Number 6*

Public Relations: Building Good Will in Coal 66

New 35-Yd Shovel Boosts Tonnage at Georgetown Stripping .. 72

Old Mine Pumped by Inside Station and Pillar Hole 74
By J. H. EDWARDS

Cable Use for Safety, Efficiency and Long Life 77
By PAUL M. BARLOW

Precleaner Materially Increases Washer Output 78

Haulway Protection All Locust With Cushioned Lagging 80

"Coal-for-Victory" Awards .....**Insert between pp. 80 and 81**

Rail Haulage Finds Its Place in Strip Mining 81
By FRED W. RICHART

Cable Boreholes Made Dry by Cementing at Orient Mines ... 84

Direct Heating for Coal-Mine Preparation Plants 87
By DAVID HENDERSON

Concrete for Ventilation, Drainage and Building Work 89
By ARTHUR E. BELTON

War Production Keynote of Cincinnati Meeting 94

Warning Lights Blink on Both Ribs 110

Bulletin Board Cast Into Concrete at Main Portal 110

Methane Pumped Through Erratic Stratum 112

Big Rock-Duster Resembles Cable-Reel Locomotive 112

Calculator Determines Line Current 114

When Pole Is Dogged, Cable Reel Is Connected 116

Driller Provides Brattice Supports 116

Editorials 65

Foremen's Forum ..... 102 — **Questions and Answers** ... 106

News From the Field ..... 119 — **Tips From Manufacturers** . 151

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To.....

SIGNED.....

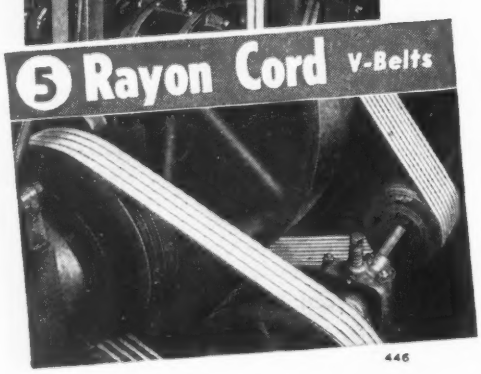
Here are

5 TYPES

of

GATES V-Belts

-Which Type Best Fits YOUR Needs?



446

Your Gates *FIELD ENGINEER* Can Tell You *PHONE* Him *TODAY!*

Whenever a drive in your plant is wearing out belts faster than it should—or is giving any other trouble—just pick up your phone and call the Gates Field Engineer.

He can quickly analyze your problem and, in most cases, he can correct the trouble very easily without needing to specify the use of any special-structure belts.

In some installations, however, belts having special characteristics will prove to be the most efficient and economical that you can use. For example, a V-belt with tension members composed of rayon cords will, in some installations, have advantages over the standard cotton cord construction.

Again, Static-Safety V-belts may best fit your special needs—or V-belts with tension members composed of flexible steel cables may be the most efficient and economical despite their higher initial cost.

> Outstandingly, the Gates synthetic rubber V-belt—which has been in extensive use for more than 6 years now—is piling up amazing service records. Under severe conditions of oil and heat, the Gates special synthetic belt actually wears 2 times to 3 times as long as any natural rubber belt!

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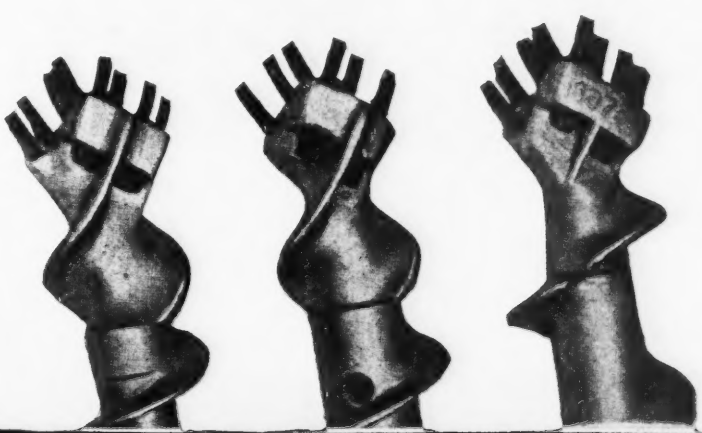
ON THE DRILLING FRONT PAYS OFF IN WORTHWHILE SAVINGS

COALMASTER Drilling Equipment teams up with your manpower and working conditions to give you the drilling results that mean greater production at lower cost.

COALMASTER design brings teamwork into your underground and strip mining operations—enabling you to select the correct tools to fit the job.

COALMASTER provides drilling assemblies for all explosive types and sizes, and hole diameter desired.



COALMASTER

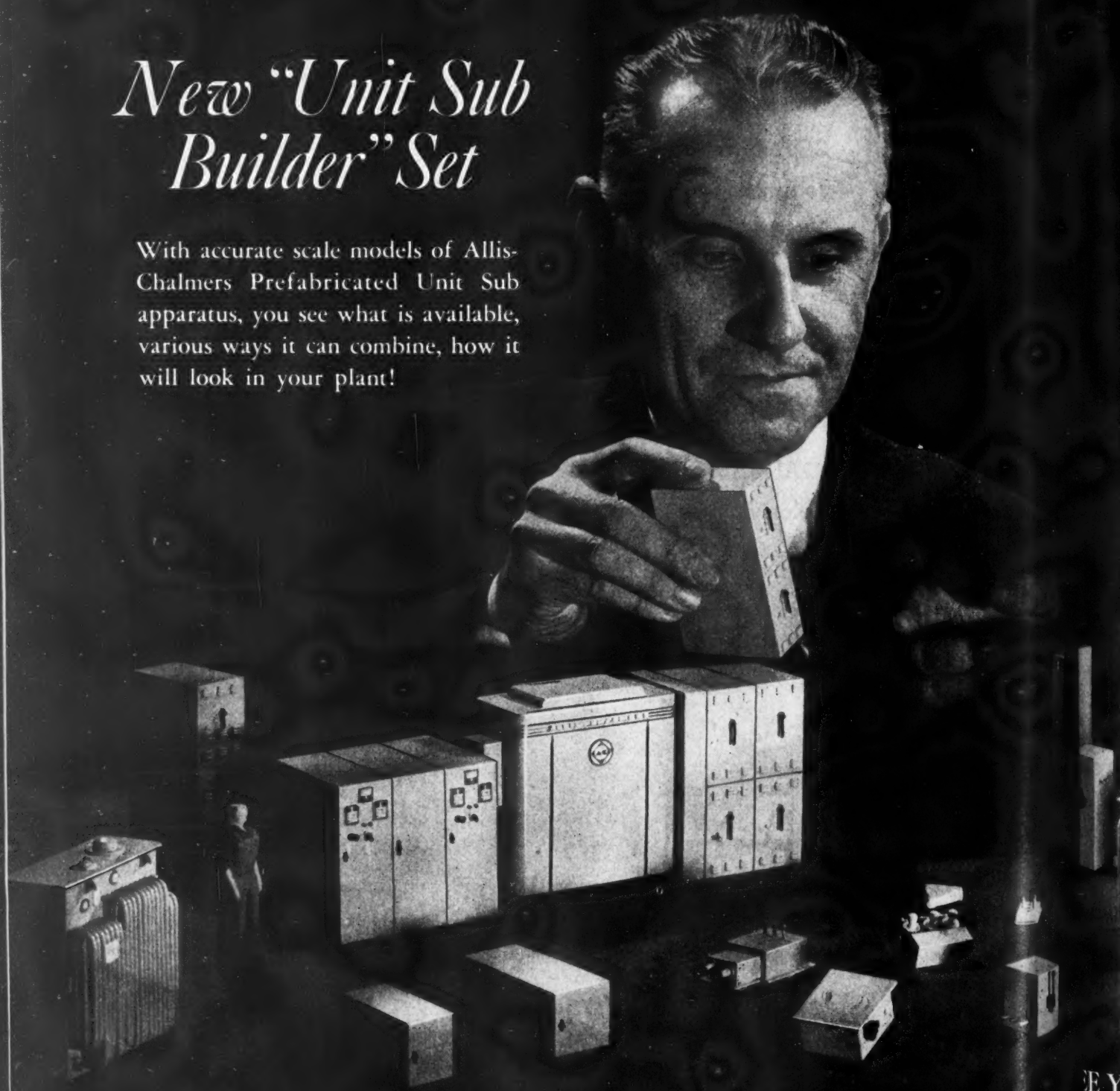
BLAST HOLE DRILLING Tools

CENTRAL MINE EQUIPMENT CO.
ST. LOUIS, MO.

Now--Simplify You U with Industry's N

New "Unit Sub Builder" Set

With accurate scale models of Allis-Chalmers Prefabricated Unit Sub apparatus, you see what is available, various ways it can combine, how it will look in your plant!



ALLIS

Unit Sub Planning
Newest Aid!

GUESSWORK IS GONE from unit sub planning when you *see* the elements of Allis-Chalmers Prefabricated Unit Substations — in accurate scale models.

You plan *visually,* effortlessly — without bogging down in charts, tables, diagrams — save time, cut way down on any chance of error.

To see for yourself how the new "Unit Sub Builder" Set can help you in your power distribution planning, call your nearby Allis-Chalmers district office.

An A-C field engineer will bring the models, together with the handy new "Unit Sub Slide Rule" for calculating breaker capacity — and new "Check List" for *double* checking all details. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

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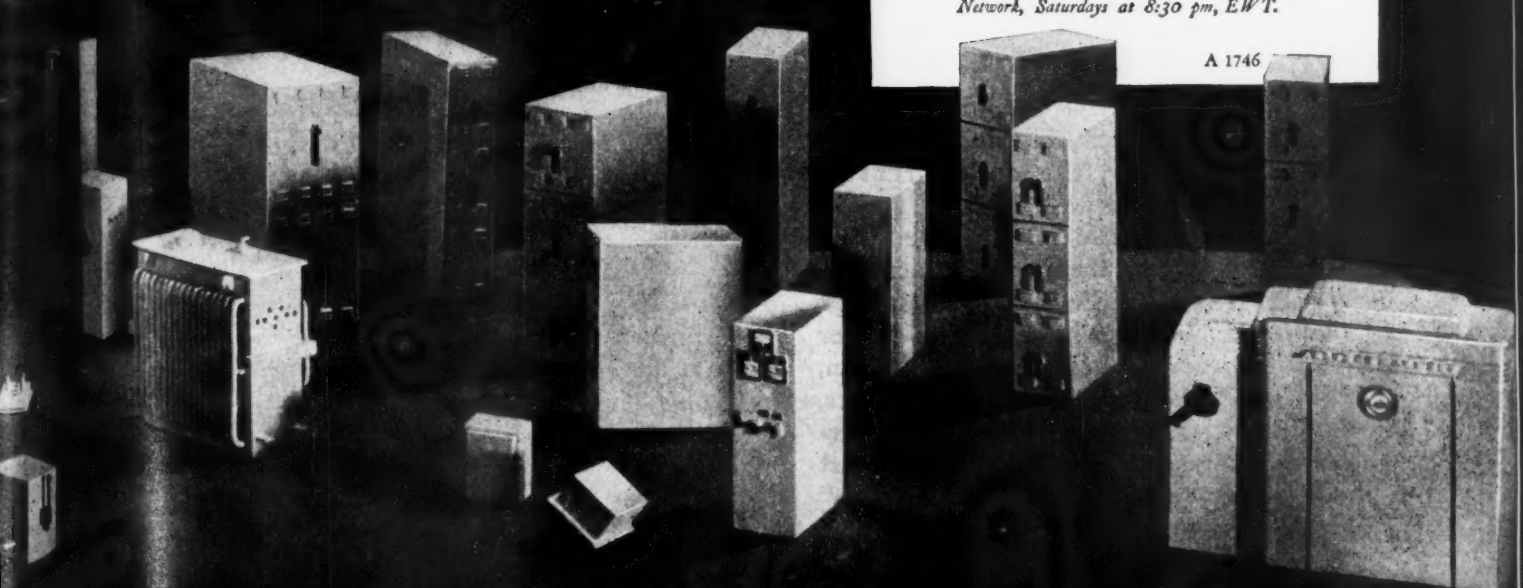
♪ *Tune in the famous Boston "Pops", Blue Network, Saturdays at 8:30 pm, EWT.*

A 1746



E YOUR UNIT SUB IDEAS WORKED OUT WITH

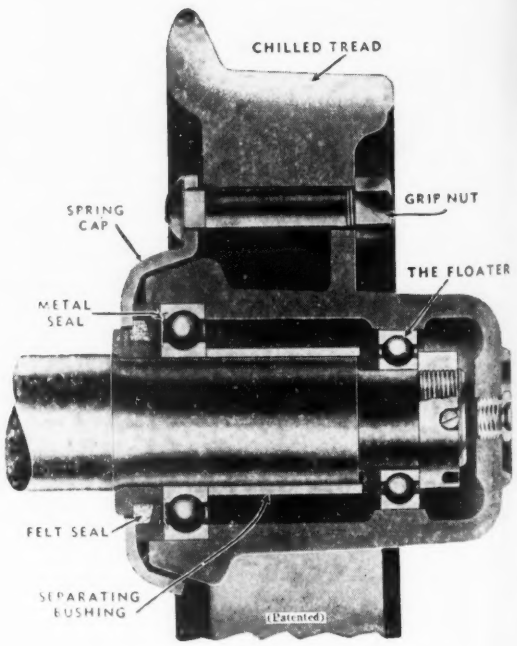
LIS CHALMERS *"Unit Sub Builder" Set*

★ To Mine
Who Want to

Here is one of the S-D "Automatics" in a mine where each car was dumped from 12,000 to 15,000 times within the first 4 years, and with tonnage hauled averaging 140,000 tons per car. This is equal to 20 years of average dumping of mine cars. At the end of the 4 years the cars were still like new.

The wheel that moves more tonnage with less power consumption

The S-D "Floater" Ball Bearing wheel is, unquestionably, the easiest running mine car wheel available. Actual mine-operation tests have proved that "Floater" wheels permit great increases in net loads handled by locomotives, compared with wheels using other types of precision bearings. In addition, "Floaters" are guaranteed for 5 years, to protect you against wheel and bearing breakage or undue wear and against undue grease consumption. "Floaters" are truly a paying investment.



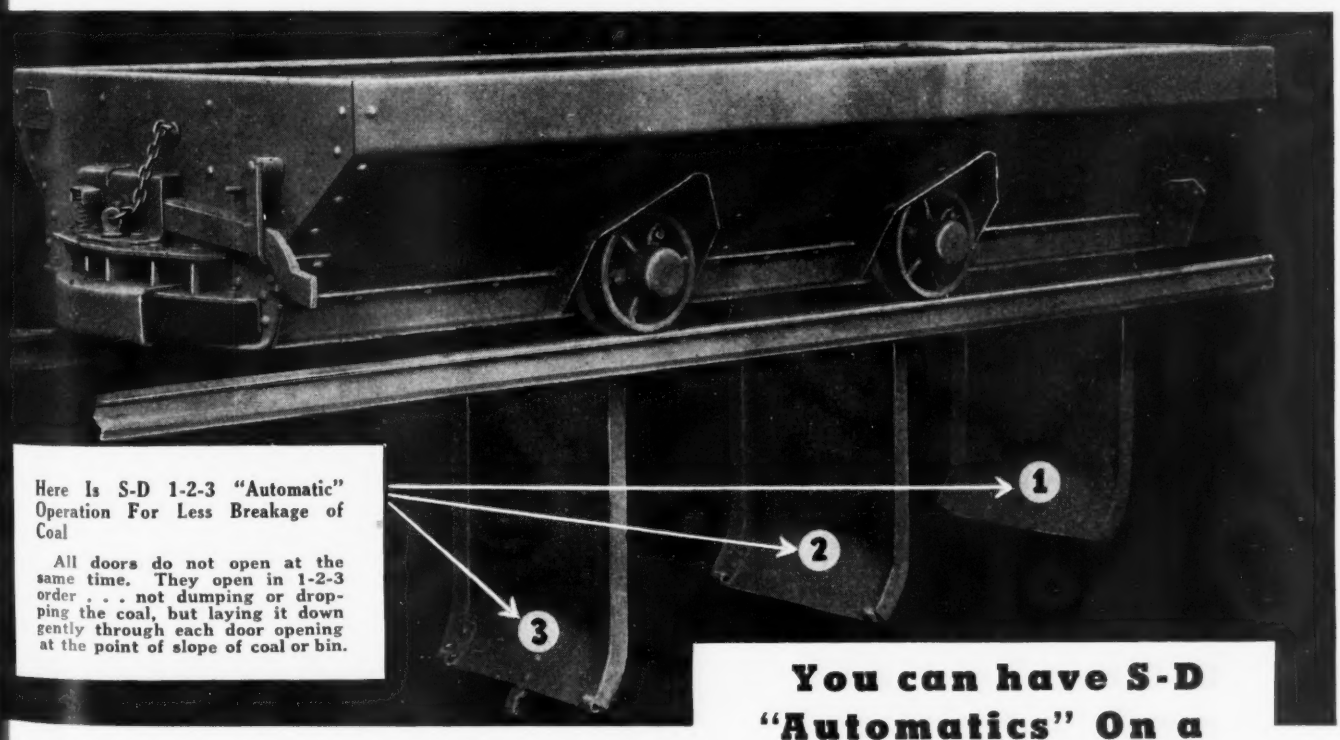
Sanford-Day Iron Works, KNOXVILLE, TENNESSEE

uperintendents
dove MORE COAL

★ We have recently been advised by a Company which "changed over" to S-D "Automatics" that for March, April and May 1942 (before the change-over) the output was 138,944 tons, representing 231,147 man-hours, whereas for March, April and May, 1943 (after the change-over) the output was 188,662 tons, representing 241,535 man-hours. Therefore, the increase in the output per man-hour was 30 per cent. This means a big saving, that you can calculate for yourself, and a saving which corresponds with previous reports from others.

This, by no means, is an unusual case. On the contrary, this record of moving more coal at less cost is the typical result at numerous mines that have "changed over" to S-D "Automatics".

Another mine using only 40 S-D 1-2-3 "Automatics", averaging 5 to 6 tons per car per trip and with a round trip haul of 2 miles, is producing 1200 to 1425 tons per 7-hour shift. This means that each car is averaging more than 6 round trips per 7-hour shift. It shows also that no time is lost in hauling or discharging coal—a saving of time that is possible only with "Automatics" . . . a saving of time that means moving more coal and at less cost.



Here Is S-D 1-2-3 "Automatic" Operation For Less Breakage of Coal

All doors do not open at the same time. They open in 1-2-3 order . . . not dumping or dropping the coal, but laying it down gently through each door opening at the point of slope of coal or bin.

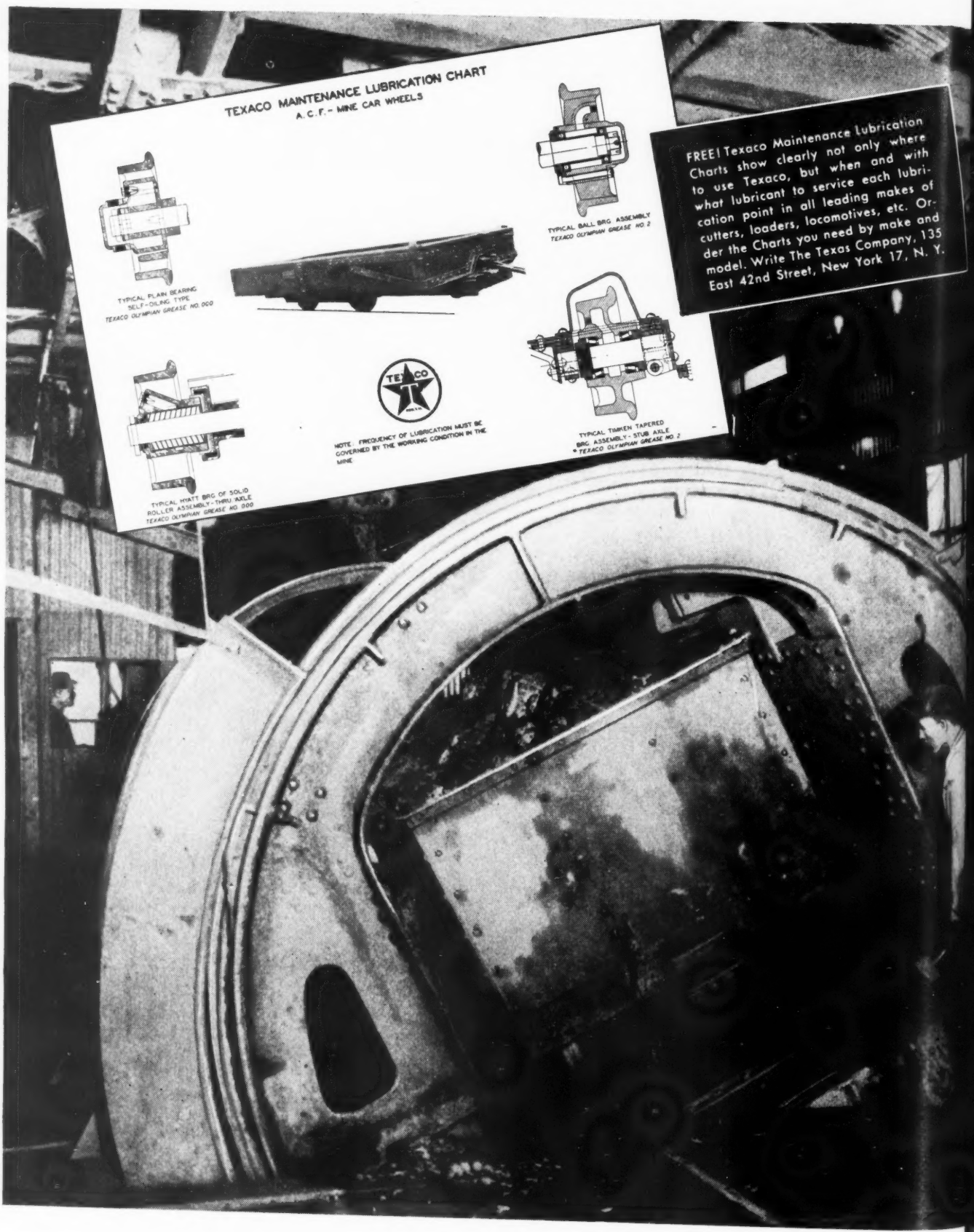
You can have S-D "Automatics" On a Liberal Rental Plan

You don't have to buy S-D "Automatics". You can take advantage of our Rental Plan and your savings will more than pay the rentals. And, if you prefer later to own the cars, you can exercise your option to buy them. Write to us about this unusual offer.

REPAIR OR REPLACEMENT WHEELS

Every month we add new customers to our list of users of high quality wheels. Send us your repair wheel orders and start reducing your replacement and maintenance costs with wheels produced by our patented annealing process. And remember this, we are prepared to furnish you with extra CAR BUMPERS, DRAWBARS, AXLE BOXINGS, AXLES, SHEAVES AND ROLLERS.

Sanford-Day Iron Works, KNOXVILLE, TENNESSEE


TEXACO MAINTENANCE LUBRICATION CHART
A. C. F. - MINE CAR WHEELS
TYPICAL PLAIN BEARING SELF-OILING TYPE
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TYPICAL BALL BRG ASSEMBLY
TEXACO OLYMPIAN GREASE NO. 2
TYPICAL HYATT BRG OF SOLID ROLLER ASSEMBLY - THRU AXLE
TEXACO OLYMPIAN GREASE NO. 000
NOTE: FREQUENCY OF LUBRICATION MUST BE GOVERNED BY THE WORKING CONDITION IN THE MINE
TYPICAL TIMKEN TAPERED BRG ASSEMBLY - STUB AXLE
• TEXACO OLYMPIAN GREASE NO. 2
FREE! Texaco Maintenance Lubrication Charts show clearly not only where to use Texaco, but when and with what lubricant to service each lubrication point in all leading makes of cutters, loaders, locomotives, etc. Order the Charts you need by make and model. Write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO
REG. T.M.

TEXACO LUBRICANTS Fo

Rolling it out....

MAXIMUM output from every piece of mechanized equipment . . . that's the only answer to today's acute manpower shortages in the coal mining industry.

Right here is where Texaco lubrication can help, because Texaco lubricants provide effective lubrication for every coal mining machine, including those universally recognized as tough to lubricate.

For example, *Texaco Olympian Grease* in mine car wheels assures easier starting, longer-lasting bearings, less need for repairs. It is equally effective for cutters, loaders, etc.

Texaco lubricants for all types of underground coal mining machinery are approved by leading manufacturers who have cooperated with us in preparing Texaco Maintenance Lubrication Charts.

Texaco Lubrication Engineering Service is available to you through more than 2300 Texaco distributing points in the 48 States. The Texas Company, *National Sales Division, Dept. C.*, 135 East 42nd Street, New York 17, N. Y.

TS For the Coal Mining Industry

It's just as simple as it looks . . .

LOWER COST...
because you use native green timber.

LOWER COST...
because handling and transportation costs are greatly reduced.

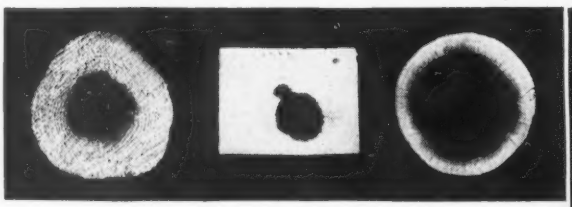
LOWER COST...
because no special, expensive equipment or heating apparatus is needed.

LOWER COST...
because it can be applied with any unskilled labor.

TREAT YOUR OWN TIMBER WITH OSMOSALTS

With Nature's Law of Osmosis doing most of the work, very little equipment is needed to treat mine timbers with OSMOSALTS. As the picture shows, only a wooden tank and a few pairs of tongs constitute both "plant and equipment." Add to this, any "available" labor, and you're ready to treat your own . . . *Saving Time and Money in the bargain.*

More than one mine is today treating timbers with OSMOSALTS and obtaining, often from standing timber supplies on the property, dry, clean, odorless treated timbers which are safe to handle and fire retardant as well. Write today for all the facts.



Illustrated above are cross sections of three kinds of timbers. The white outer areas, which have been subjected to standard color reagent tests, show the deep penetration of the toxic chemicals in Osmosalts.

OSMOSALTS

Nature's Method of Wood Preservation

MANUFACTURED BY

OSMOSE WOOD PRESERVING COMPANY OF AMERICA, INC.

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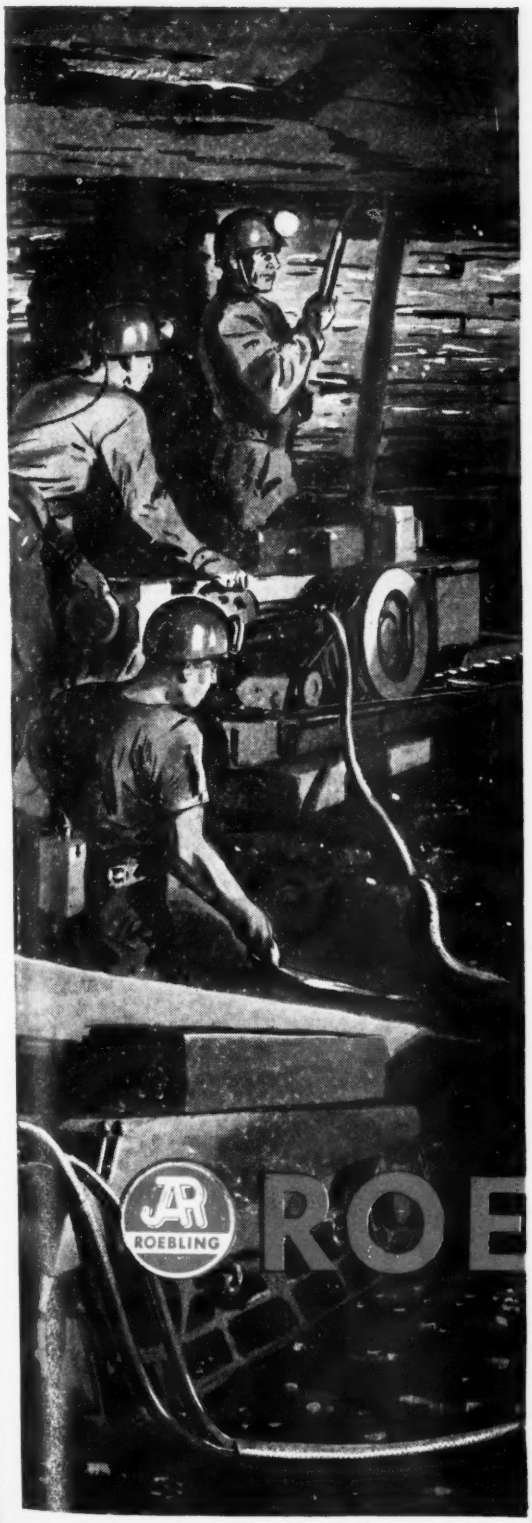
Tomorrow's Mines will *Modernize* Electrically

CUTTING, HAULING, LOADING ...WITH POWER...SPEEDS TONNAGE



A MOST IMPORTANT REASON for the necessity of modernizing after the war is obsolescence, not alone in machines, but in methods.

More and more mines are mechanizing their drilling, cutting, gathering and loading—bringing greater efficiency to these operations, and—of growing importance — better working conditions, better labor relations. Very noticeable is the swing to the use of electric equipment for room and gathering haulage—such as the shuttle car, which runs back and forth from the room to the nearest haulage way, or the short, portable conveyors.

What do *your* modernization plans call for? Better maintenance of working voltages? Better ventilation? Pumping? Surface preparation? Or over-all mechanization? Whatever your requirements, let your electric company's local power engineer help you plan. His experience is *yours* for the asking.

And when Victory releases restrictions on the wires and cables you'll need, remember Roebling as *wire specialists,* ready to provide the right conductor for every job.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities

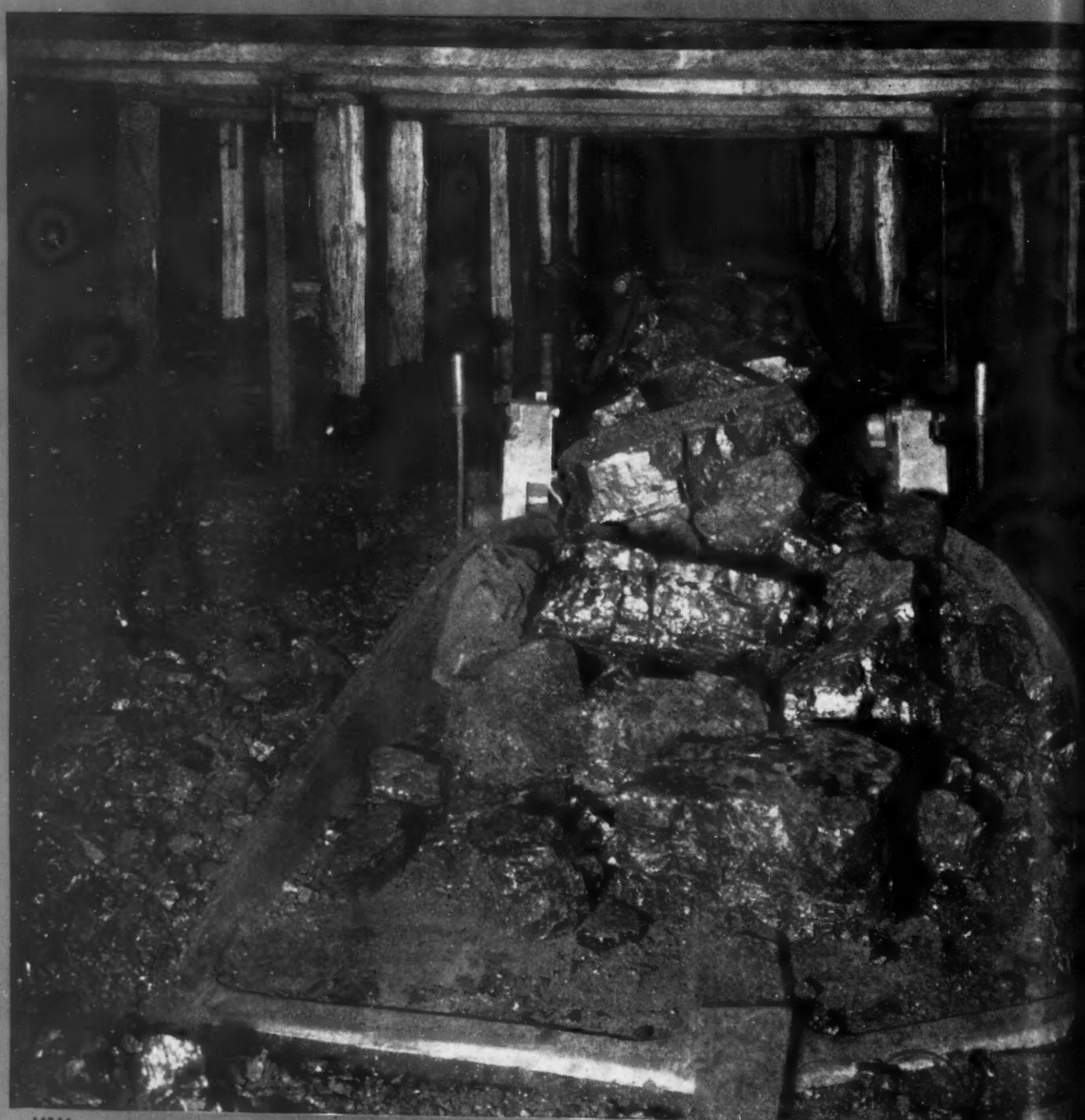
ROEBLING

PACEMAKER IN WIRE PRODUCTS

Wire Rope and Strand • Fittings • Cold Rolled Strip • High and Low Carbon Acid and Basic Open Hearth Steels • Aircord, Swaged Terminals and Assemblies • Round and Shaped Wire • Wire Cloth and Netting • Electrical Wires and Cables • Suspension Bridges and Cables Aerial Wire Rope Systems

Mine entry cables
Mining machine cables
For Every Job ....The Right ROEBLING Electrical Wire and Cable
Locomotive reel cables
Bore hole cables
Trolley wires

Goodman Shaker



14344

GOODMAN MANUFACTURING COMPANY

Conveyors and Duckbills

Duckbill

Reasons why this equipment for loading and moving coal is extensively used:

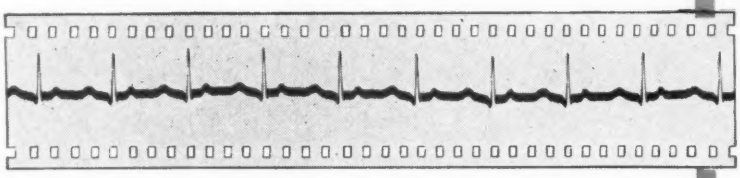
- adaptable to most any mining condition; particularly effective for rapid extraction under bad top
- large tonnages are obtained in concentrated areas of fewer working places
- continuous working cycle can be maintained at face
- greater percentage of lump coal
- low initial cost, low maintenance

For the complete story see a Goodman sales engineer, or write for illustrated literature

ARMY NAVY

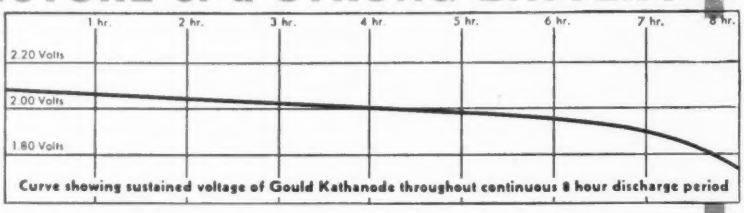
HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS

PICTURE of a STRONG HEART



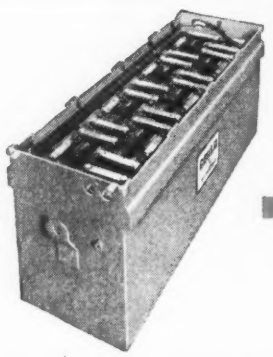
Medical science has developed the electro-cardiograph for recording heart action on film. With these film recordings the physician can make accurate heart diagnosis.

PICTURE of a STRONG BATTERY



Curve showing sustained voltage of Gould Kathanode throughout continuous 8 hour discharge period

A Gould Kathanode provides a minimum of voltage change even on continuous discharge over an eight hour working shift. The chart shows the efficient performance of a strong battery.



NOT A MATTER FOR GUESSWORK

Your battery requirements are not a matter for guesswork. That is why Gould first sends its field engineers to get "on the spot" information. Technicians in the nearest of the 11 Gould factories serving the United States convert that information into the right battery to do your job. Then Gould technicians make periodic tests to insure peak efficiency.

Have you received your new Gould Ampere Hour Meter Charging Chart, and the latest edition of Bulletin 100 describing Gould Kathanode Glassklad Batteries? Both are free. Write for them.

GOULD STORAGE BATTERY CORPORATION, DEPEW, NEW YORK

Factories: Atlanta, Ga. • Chicago, Ill. • Dallas, Texas • Depew, N. Y. • Leavenworth, Kan. • Los Angeles, Calif. • North Bergen, N. J. • Rock Island, Ill. • St. Paul, Minn. • Sioux City, Iowa • Zanesville, Ohio

— Buy War Bonds —

FOR EXCELLENCE IN STORAGE BATTERY PRODUCTION AT DEPEW PLANT

GOULD

Since 1898 THE BATTERY PICKED BY ENGINEERS

BLACK OXIDE

Gould's Unique Active Material

One of a series of informative articles for users of industrial batteries.

▶The manufacture of Gould's famous Black Oxide begins with balls of chemically pure lead. These are exposed to the action of oxygen in special rotary mills, where their surfaces are changed to a black lead oxide. Then, through abrasive action, this oxide breaks off, each particle carrying with it a core of pure lead.

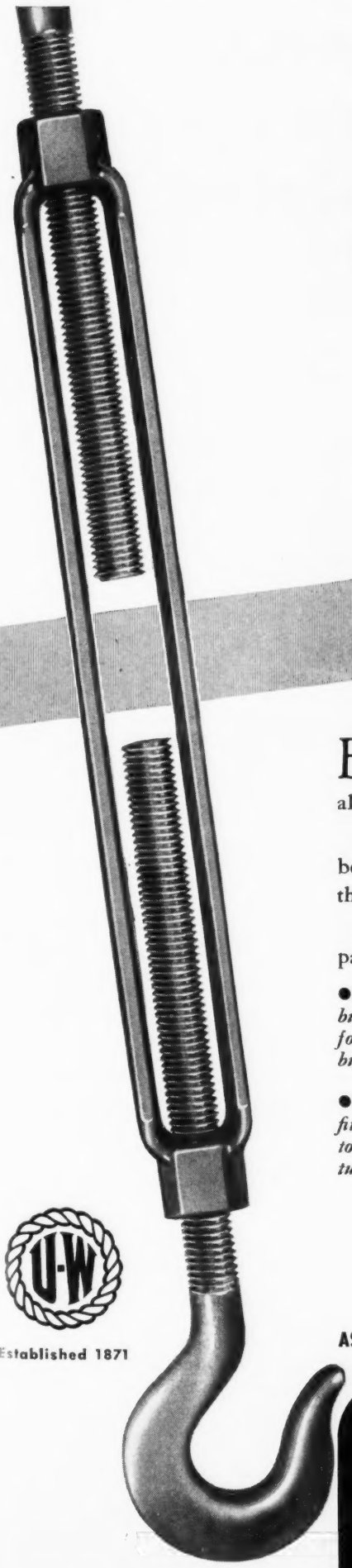
That core is important for, where a grain of ordinary active material is completely oxidized when set in the grid, Gould's Black Oxide retains a certain portion of unconverted material. This provides an abundant reserve which is available to replace active material which wears away in normal service during the life of the battery.

Field and laboratory tests prove that progressive disintegration takes place in all types of active material. In everyday service, the outer surfaces of the material wear out. As a result, a battery with ordinary active material starts to lose capacity soon after it is put into service. Eventually, as more and more material wears away, each grain decreases in size and loses contact with its neighbor. Conductivity decreases as each grain shrinks and the battery's decline in capacity is thus rapidly accelerated.

With Gould's Black Oxide, the user benefits from an entirely different action. The outer "skin" of this material wears out in the same manner as described above, but as this change takes place, some of the free lead in each grain's core is exposed to the action of the electrolyte and is converted by electro-chemical action into additional active material. As this conversion takes place, the grains increase in size to maintain their original volume. Thus, not only is capacity maintained, but, at the same time, conductivity is assured for the life of each plate.

Gould's Black Oxide, the positive active material with the pure lead core, is made in the Gould plant at Depew, New York. It is an exclusive Gould development prepared for use in Gould Kathanode batteries to assure their users of long battery life with high-sustained capacity.

Are you on the free mailing list of the illustrated Gould Battery News, a publication of interest to storage battery users. A request on your business letterhead will bring it to you.



What makes this Upson-Walton Turnbuckle a better Turnbuckle

BUYING a turnbuckle is like buying a steak . . . or a watch . . . or a hammer—or anything! Exercise good buying judgment and you can always get something better.

Upson-Walton turnbuckles are *better turnbuckles*—and *better buys*—because of specific refinements in design and engineering initiated by this three-quarter-century old, modern company.

If you are using another make of turnbuckle now, check it against this partial list of Upson-Walton specifications.

- **The bodies** *of Upson-Walton turnbuckles are made in closed dies for uniformity—a 12" Upson-Walton turnbuckle always gives 12" of take-up.*
- **All Upson-Walton** *bodies and fittings are straightened after forging to insure a true thread and permit the turnbuckle to develop maximum strength.*
- **The body reins** *of all Upson-Walton turnbuckles are wider than the shank diameter—affording protection for the threads.*
- **Reins** *are constructed with ample section and rigidity, so that a bar may be safely inserted to set up tension.*
- **All Upson-Walton** *turnbuckles are designed so that heads have a full hex —a wrench can be applied on any pair of flats and have full bearing.*

U-W

Established 1871

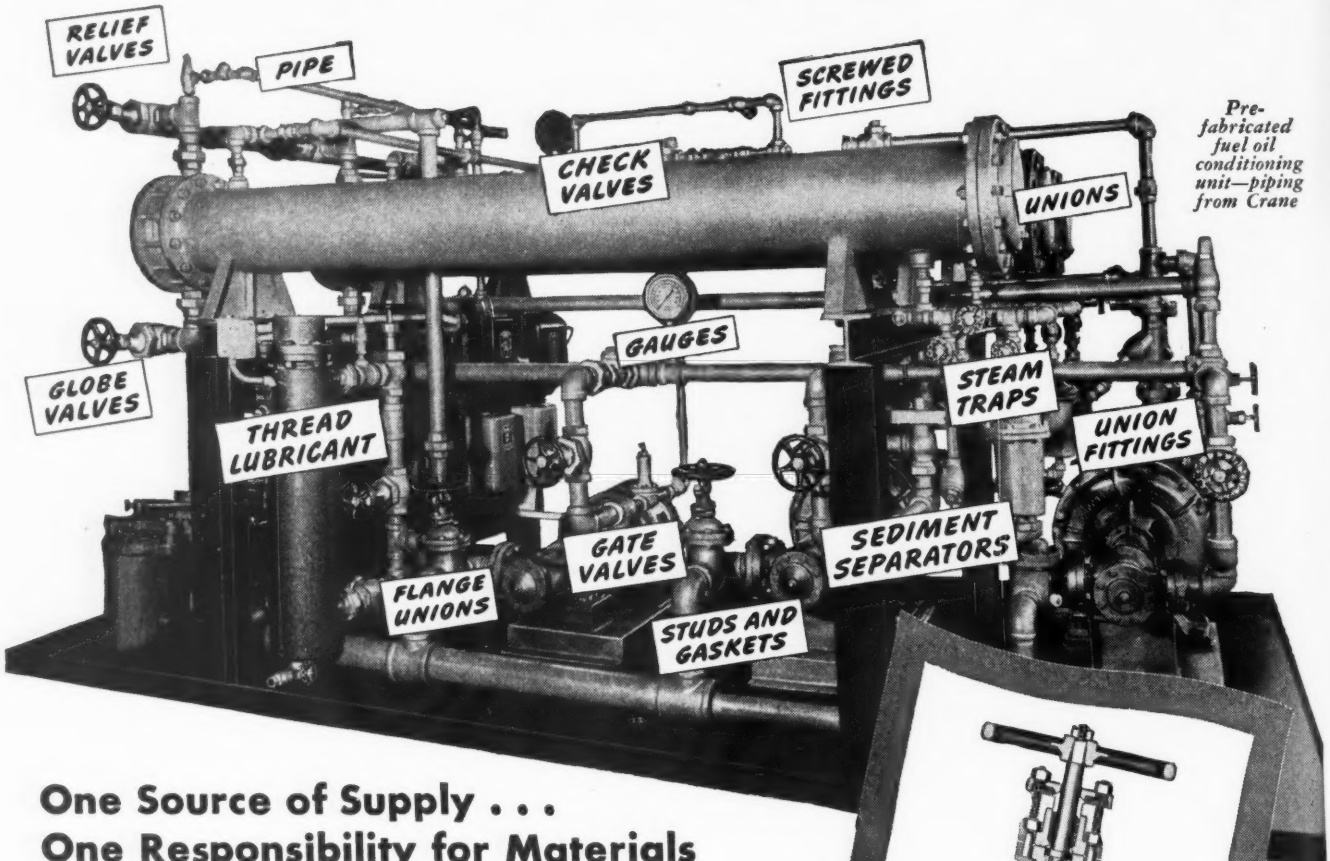
AS WE GO TO PRESS, DELIVERIES ON UPSON-WALTON TURNBUCKLES ARE GOOD.

THE UPSON-WALTON COMPANY

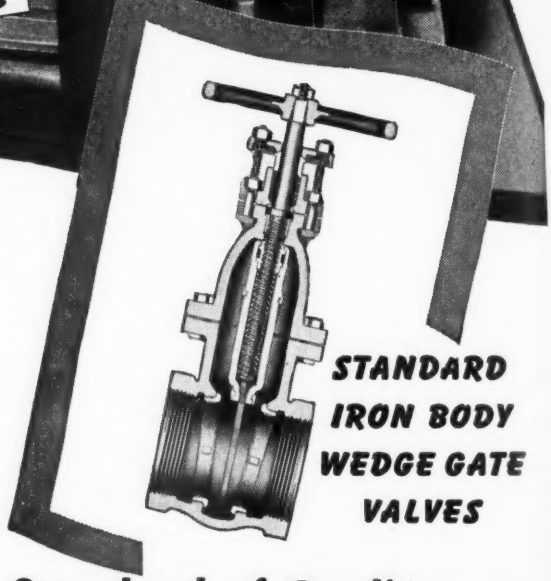
Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks

NEW YORK • PITTSBURGH • CLEVELAND • BUFFALO • CHICAGO

Complete systems or single fittings... Crane meets every piping need



Pre-fabricated fuel oil conditioning unit—piping from Crane



STANDARD IRON BODY WEDGE GATE VALVES

One Source of Supply . . . One Responsibility for Materials

In buying day-to-day piping needs—or when you're planning complete new systems—the benefits of single source supply can be yours. Crane supplies everything for piping—valves, fittings, pipe, and all accessories—as indicated by the installation above. And where can you expect more complete selection than in the world's largest line of flow-control equipment for every service.

Ordering—handling parts stocks—maintenance—all these operations are simplified when you Crane equip. More important, one responsibility for quality and craftsmanship of piping materials is a primary aid to good installation. Crane meets that responsibility with 89 years of manufacturing experience.

CRANE CO., 836 S. Michigan Ave., Chicago, Ill.

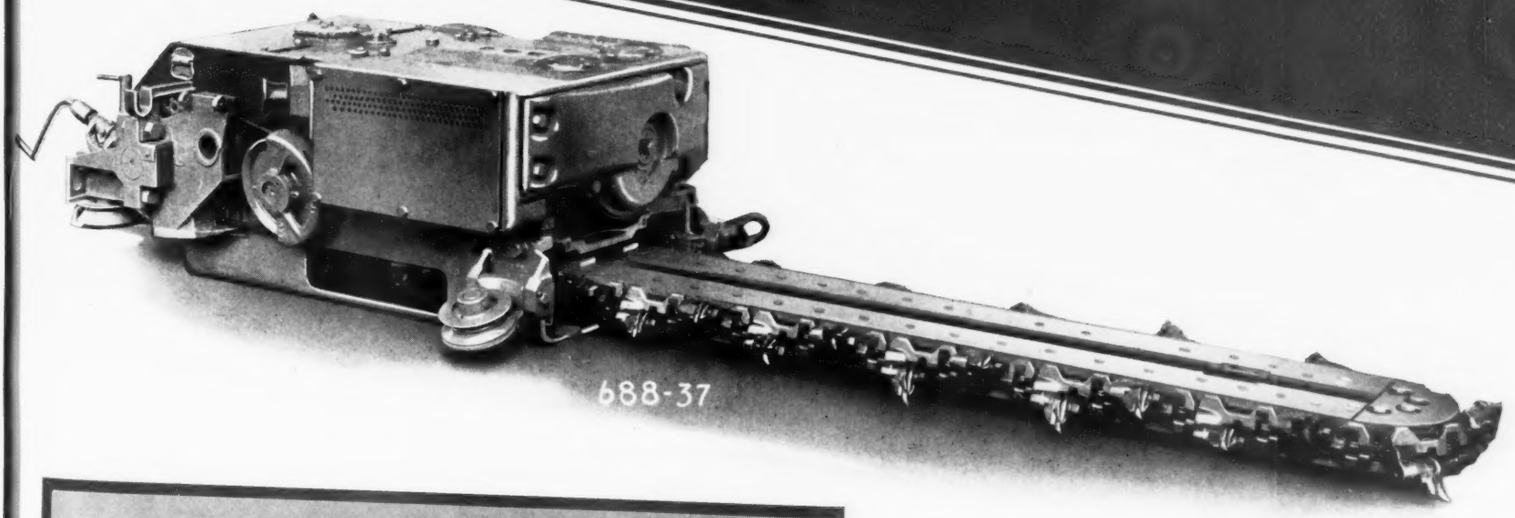
One Standard of Quality . . .

Because there is adequate quality in every part, the whole system is thoroughly dependable when it's Crane equipped. Such quality is typified by Crane Iron Body Gate Valve design: Strong body sections resist severest line strains. Straight-through ports give streamline flow. A deeper stuffing box lengthens packing life. Extra long guides keep disc travel true, while balanced stem design maintains smooth and positive operation.

CRANE

VALVES • FITTINGS • PIPE
PLUMBING • HEATING • PUMPS

JEFFREY SHORTWAL

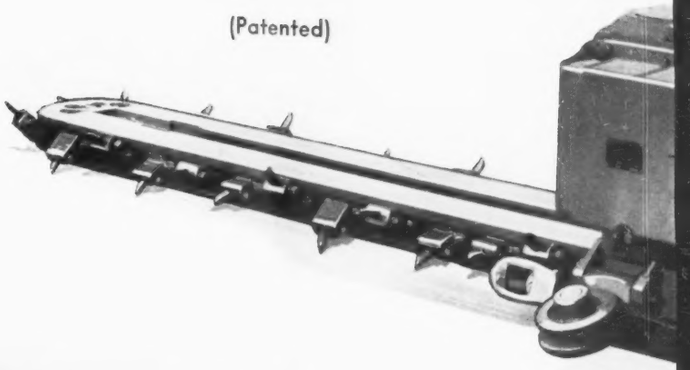


(ABOVE)

JEFFREY 35-BC CUTTER

• This conveyor type shortwall cutter is identical to the 35-BB continuous duty machines except that it is powered by a 35 H.P. motor. It retains the rugged mechanism and heavy construction of the famed 35 series Shortwall machines. All Jeffrey Shortwall machines are available with either A. C. or D. C. operation and as open or Government approved equipment.

(Patented)

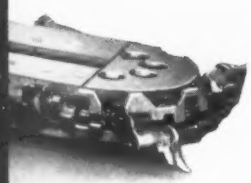


WALL CUTTERS

• This is a continuous duty machine with a 50 H.P. motor. The independent operation of the feed and handling mechanism makes control very flexible, permitting the machine to be sumped and the cut started across the face with one setting of the jacks. Jeffrey Shortwall coal cutters have been the accepted standard of industry for many years. They are designed to meet every requirement of shortwall mining.

JEFFREY 35-BB CUTTER

(BELOW)



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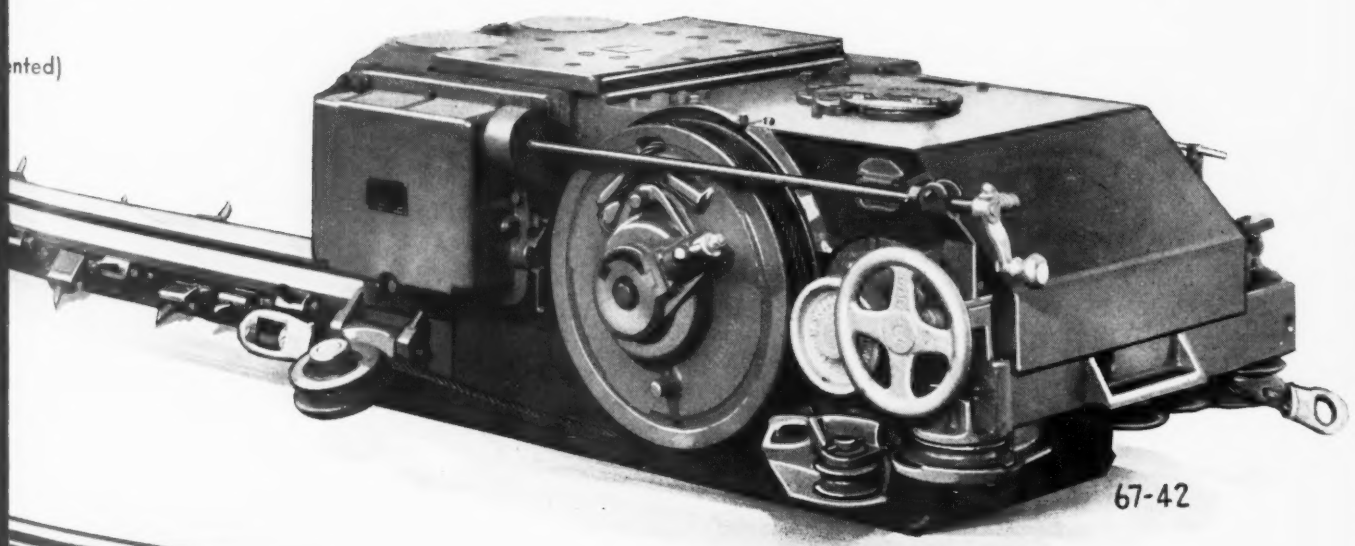

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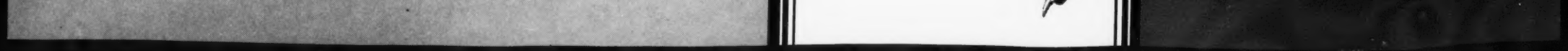
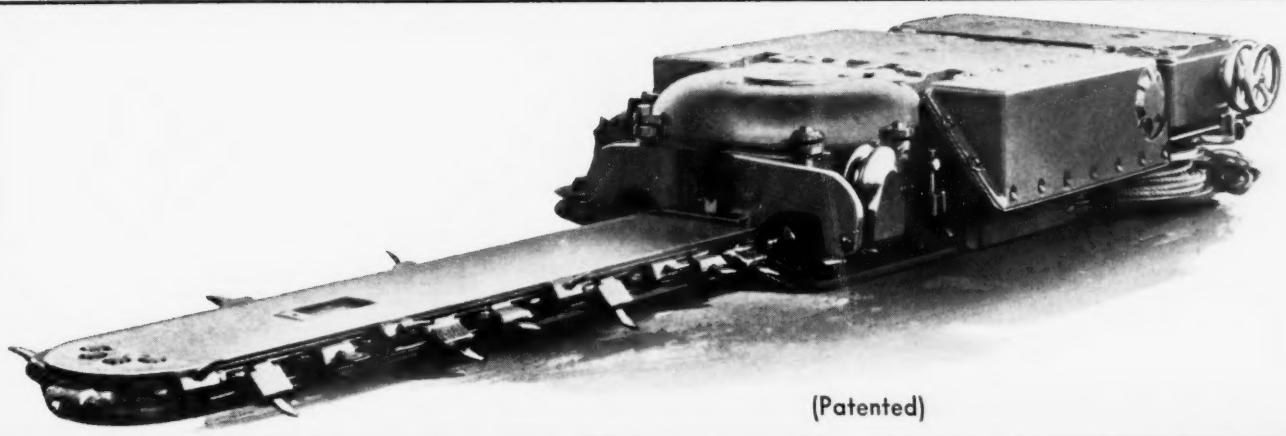


620,000,000 TONS OF BITUMINOUS COAL FOR 1944

JEFFREY CUTTERS

will figure prominently in reaching this goal



(Patented)

FOR THIN SEAMS

JEFFREY 35-L

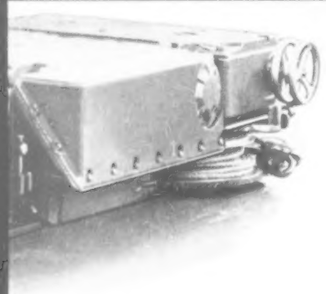
• Low overall height combined with ease of handling makes it particularly adaptable to thin seam operations. Simple rugged design — powerful 50 H.P. motor — large shaft and gears — low speed bearings . . . are a few of the many construction points contributing to the dependability of the Jeffrey 35-L and its immunity to frequent breakdowns.

BUY WAR BONDS

Jeffrey

SERVES THE INDUSTRY
BELOW AND ABOVE GROUND
FROM FACE TO RAILROAD CAR

CUTTERS
DRILLS
LOADERS
LOCOMOTIVES
FANS
CONVEYORS
BLOWERS
JIGS
CRUSHERS
SCREENS
RENEWAL PARTS



THE JEFFREY MANUFACTURING COMPANY
Established in 1877
912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

Sales Offices:	Baltimore Birmingham Boston Buffalo	Chicago Cleveland Cincinnati Detroit	Denver Harlan Houston Huntington	Milwaukee New York Philadelphia Pittsburgh	Scranton St. Louis Salt Lake City
Service Stations:	Pittsburgh Harlan, Ky.	Birmingham St. Louis	Logan-Beckley W. Va.		Scranton
Foreign Plants:	Jeffrey Mfg. Co., Ltd. Montreal, Quebec	British Jeffrey-Diamond, Ltd. Wakefield, England	Jeffrey-Galion (Pty.), Ltd. Johannesburg, S. A.		

BUY WAR BONDS

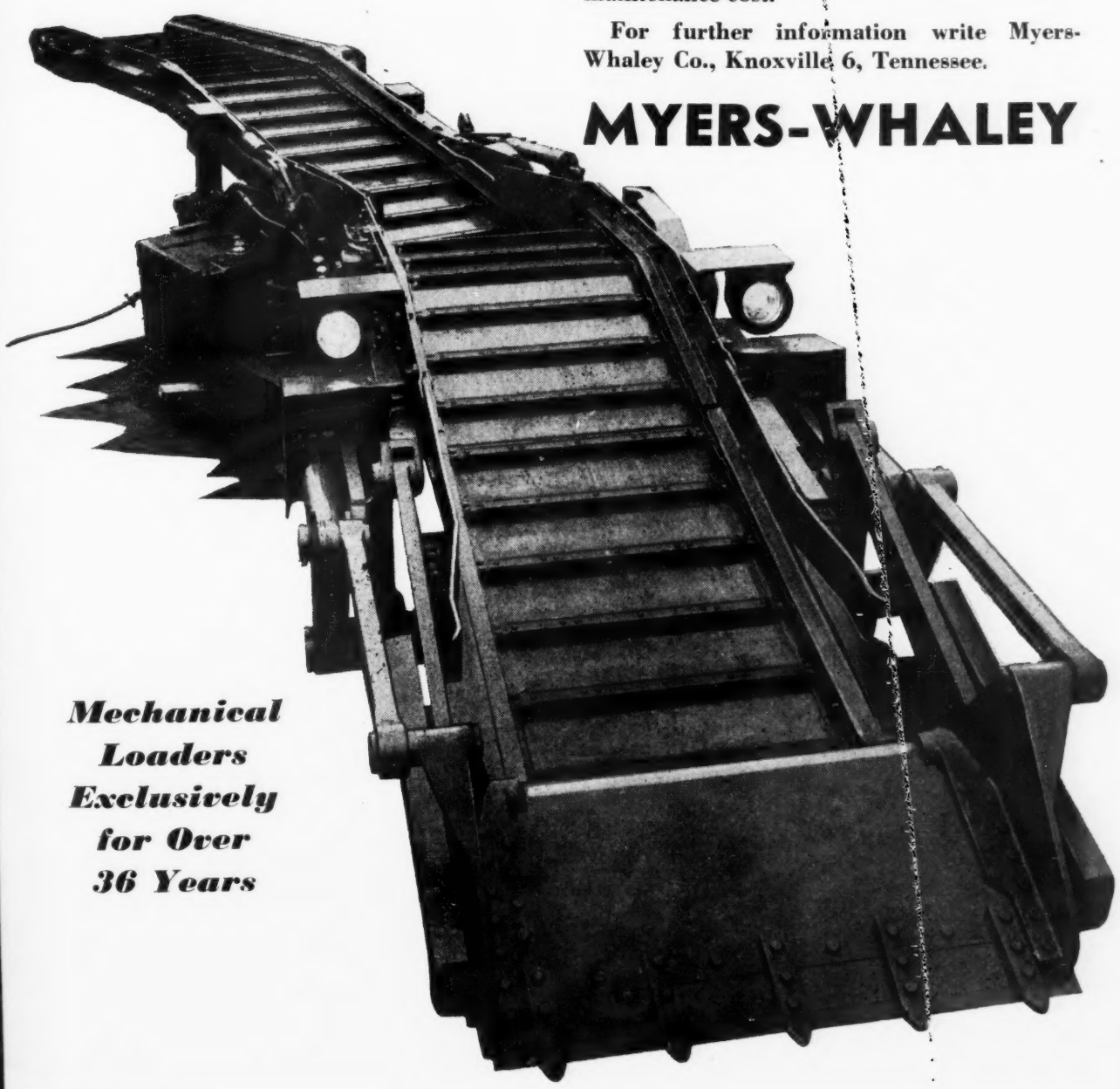
You Can Change To COMPLETE SEAM Mining– –with the WHALEY "AUTOMAT"

★ Taking it All—rock or slate and coal together—and doing it consistently, day in and day out, is no new venture for the Whaley "Automat". Perhaps you are not aware of the fact, but "Automat" loaders have handled millions of tons of material by the COMPLETE SEAM Mining method. Where this method of mining prevails, the Whaley "Automat" has been a most effective loader, producing real tonnage at minimum cost.

The ability of the "Automat" to stand up under such gruelling service is due to its natural shoveling action loading head. It is designed for such service and will take the rock equally as well as coal at small increase in maintenance. It is well known that the average loader cannot stand up to the punishment of complete seam mining. It's this unusual ability to do the heavy work that makes the "Automat" so dependable, for so long, in selective coal loading at minimum maintenance cost.

For further information write Myers-Whaley Co., Knoxville 6, Tennessee.

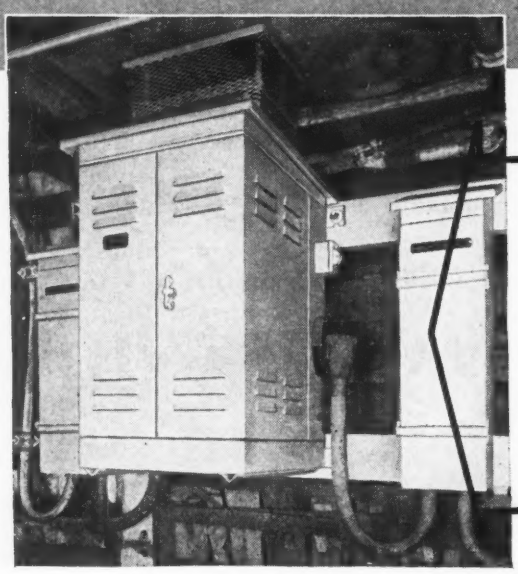
MYERS-WHALEY



Mechanical Loaders Exclusively for Over 36 Years

CUT FIRE HAZARDS and PROTECT PRODUCTION

with



Sectionalizing Circuit Breakers

A sectionalizing circuit breaker strikes right at the chief source of mine fires—at electrical disturbances on underground distribution systems. In so doing, this circuit breaker helps the mining industry do SAFELY a job that it MUST do—it must produce peak tonnage.

To mine the coal needed for the war, the industry uses more electrically-driven equipment than ever before. Electrical circuits are larger and have more to do. With greater mechanization, the greater the chances for faults to occur. The more faults, the more fire hazards. The more equipment, the greater the tie-up. Without protection at the source of trouble, nasty situations DO occur, which interfere with production, sometimes 100 percent.

Each sectionalizing circuit breaker is located at or near any fault that arises. Being at hand, it "knows" of the disturbance and responds, whenever necessary, by opening the local circuit. It "knows" of disturbances that would never register on a distant substation circuit breaker. In opening the local circuit, it keeps other sections of the mine from being penalized.

There are other reasons, and good ones, for using sectionalizing circuit breakers. I-T-E engineers who helped pioneer with sectionalizing, will tell you all about them. There's a representative near you and plenty of data from installations to apply to your condition.

Representatives in Principal Mining Areas

I-T-E

AIR SWITCHGEAR

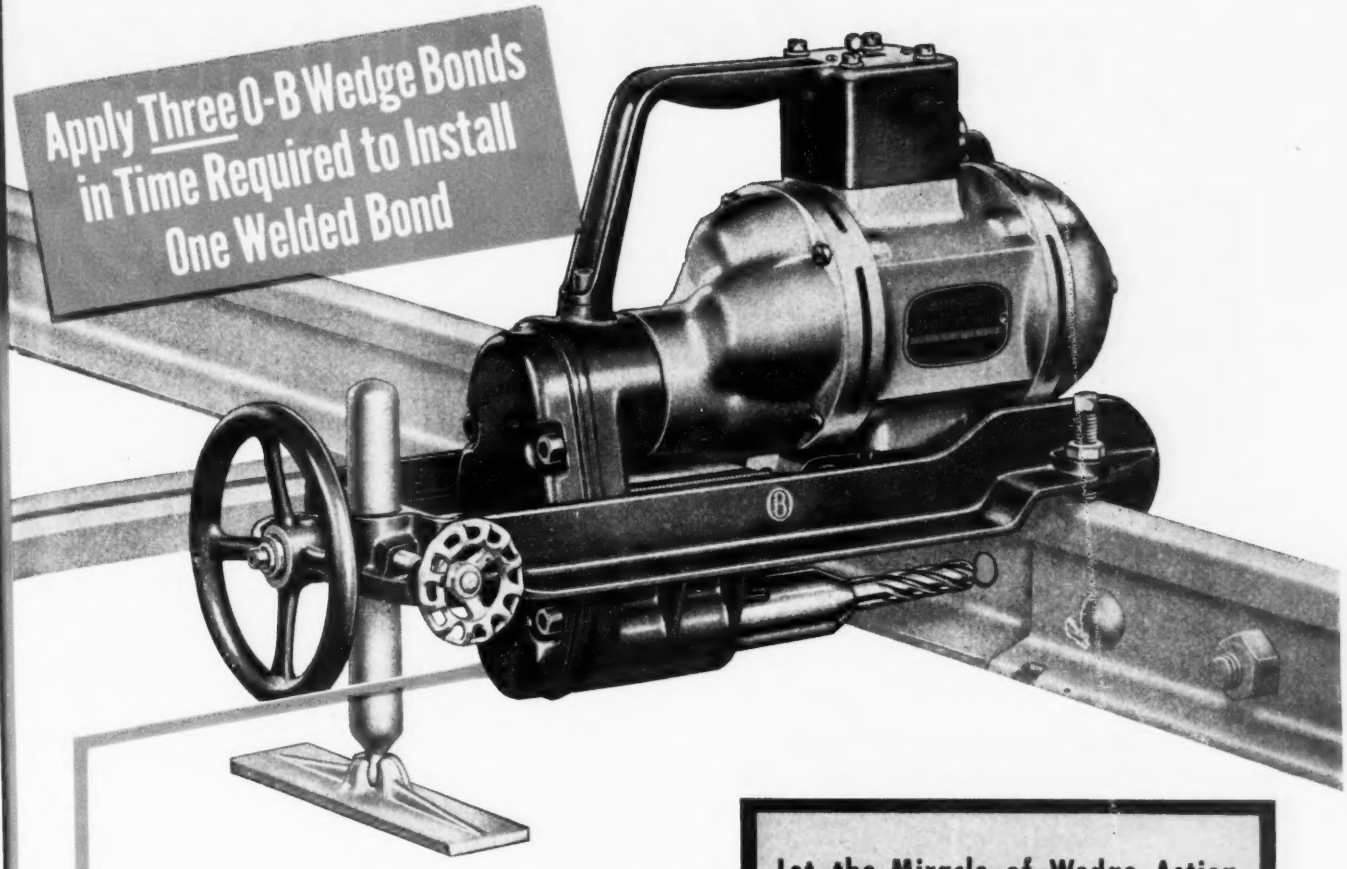
IMMERSED IN AIR — ENCASED IN STEEL

The Army-Navy "E" for Production Excellence

CIRCUIT BREAKER CO., PHILADELPHIA 30, PA.

GET MORE BONDED JOINTS PER *Man Day* WITH O-B ELECTRIC MOBILDRILL

Apply Three O-B Wedge Bonds in Time Required to Install One Welded Bond



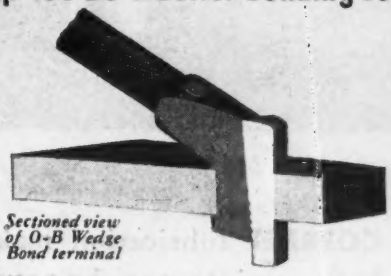
IT'S EASIER . . . Requires no special skills or technique to operate.

IT'S FASTER . . . Complete Wedge Bond installation in less than five minutes.

IT'S MODERN . . . Keyed to needs of today's mechanical mining methods.

IT'S PORTABLE . . . Light-weight and easy to carry from rail-joint to rail-joint.

Let the Miracle of Wedge Action Help You Do a Better Bonding Job!



Sectioned view of O-B Wedge Bond terminal

O-B Wedge Bond Principle Steps Up Simple Hammer Blow to 20,000-lb. Expansion Pressure—Terminal Cold-Welded to Rail Web in "Permanent" Mechanical and Electrical Union

WRITE FOR BOOKLET 764M

Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd., Niagara Falls, Ont.

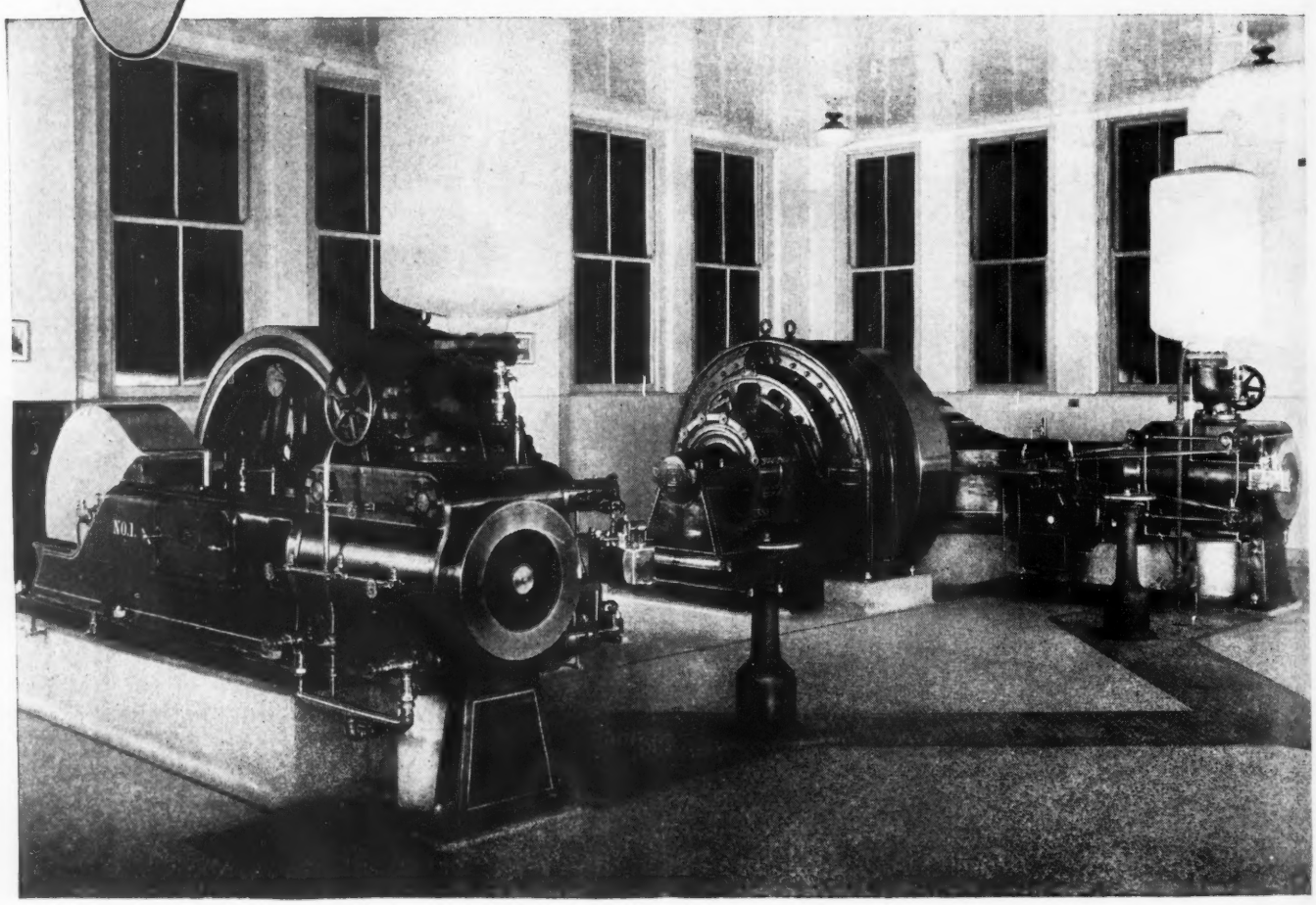
KEEP BUYING WAR BONDS

2508-M

ARMY E NAVY

MANSFIELD PLANT

CORRECT Lubrication means Better Maintenance



CORRECT lubrication makes for better maintenance by preventing excessive wear.

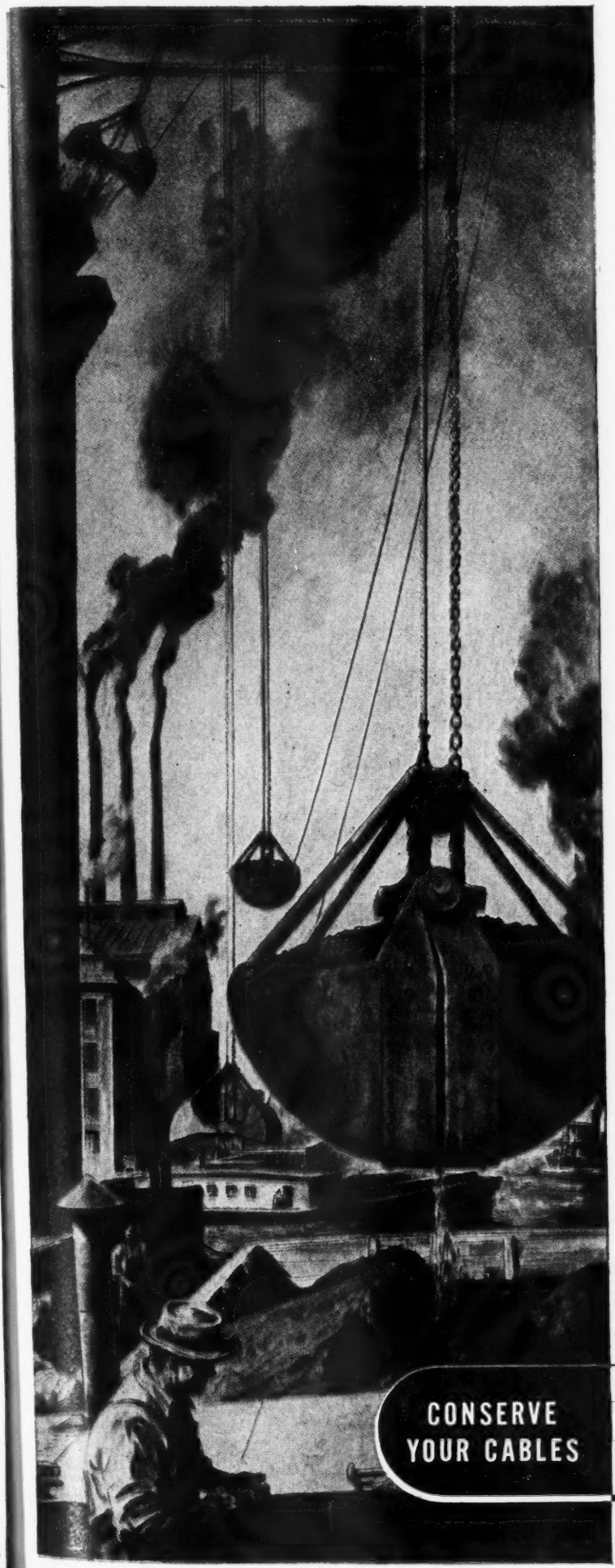
Sinclair STEAM CYLINDER and VALVE OILS are designed for *correct* lubrication of engines under all loads and any combination of speeds, pressures, temperatures and wet, dry or superheated steam conditions.

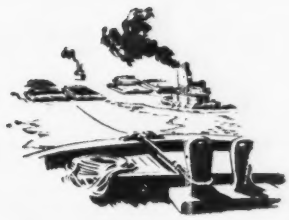
Where continuous heavy duty operation threatens excessive wear and overhaul shutdowns there is a lubrication problem. Consult us about it.

(Write for "The Service Factor" – published periodically and devoted to the solution of lubricating problems.)

SINCLAIR INDUSTRIAL OILS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.





SURPASSING coal passer!...

Once a hundred husky coal passers would have worked a full day to empty the great barge of bituminous... Today, a giant grab bucket swoops down from a hundred foot tower . . . stops smoothly in the open hatchway, clutches a ton or more of fuel from the hold . . . races up and releases its load in the high bunkers . . . sends the barge away empty within a few hours.

Subject to sudden starts and stops, lifting heavy loads against gravity, working in all kinds of weather, the coal supply of large central stations is dependent on wire rope... muscle of modern industry in shipyards, steel mills, oil fields, logging camps, mine shafts, skyscrapers. And today much of the best wire rope, ranging from huge ship hawsers to fine airplane controls, is Rochester.

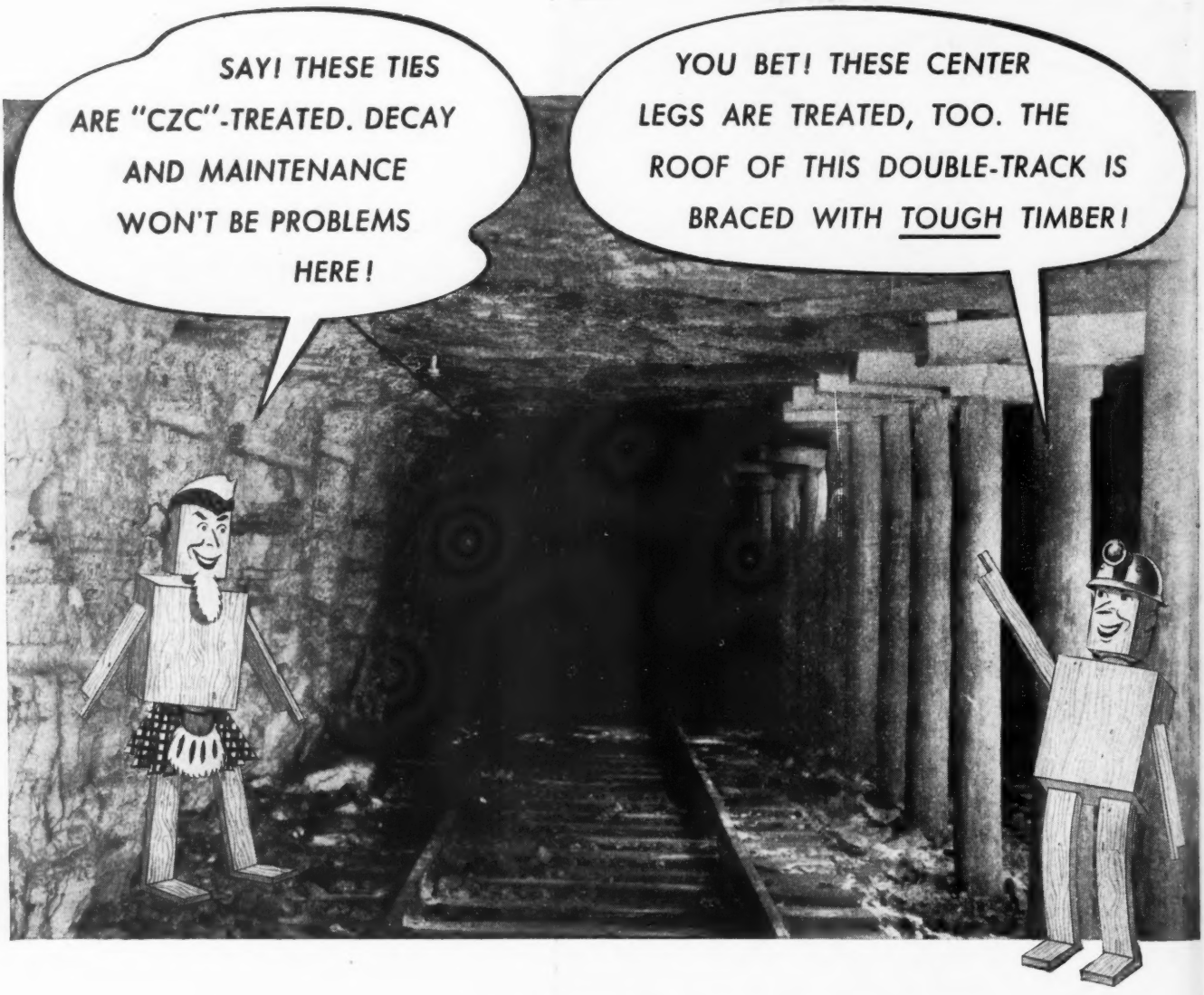
Wire rope is war material, available only to the services and high priority industries. Take care of your cables—make them last. And after the war, for the best in wire rope, remember the name... Rochester!

ROCHESTER Ropes

JAMAICA, NEW YORK • CULPEPER, VIRGINIA

Jamaica, N.Y., and Culpeper, Va., plants

Wire rope is precious now! Take proper care of what you have!


SAY! THESE TIES ARE "CZC"-TREATED. DECAY AND MAINTENANCE WON'T BE PROBLEMS HERE!
YOU BET! THESE CENTER LEGS ARE TREATED, TOO. THE ROOF OF THIS DOUBLE-TRACK IS BRACED WITH TOUGH TIMBER!

SPECIFY "CZC"-TREATED TIES & TIMBERS FOR SAFER, MORE ECONOMICAL MAINTENANCE
1. Decay resistant
2. Fire retardant
3. Odorless
4. Safe to handle

TODAY, more than ever before, the trend is to ties and timber treated with Chromated Zinc Chloride. And no wonder! Decay that flourishes in the humidity of the average mine is prevented by "CZC." Treated ties and timber last many times longer, add safety, reduce maintenance costs and actually pay dividends by eliminating frequent and early replacements.

Get all the facts about wood preservation for mines. Write E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, Wilmington 98, Delaware.

Let's All BACK THE ATTACK!

DU PONT CZC

(CHROMATED ZINC CHLORIDE)

WOOD PRESERVATIVE

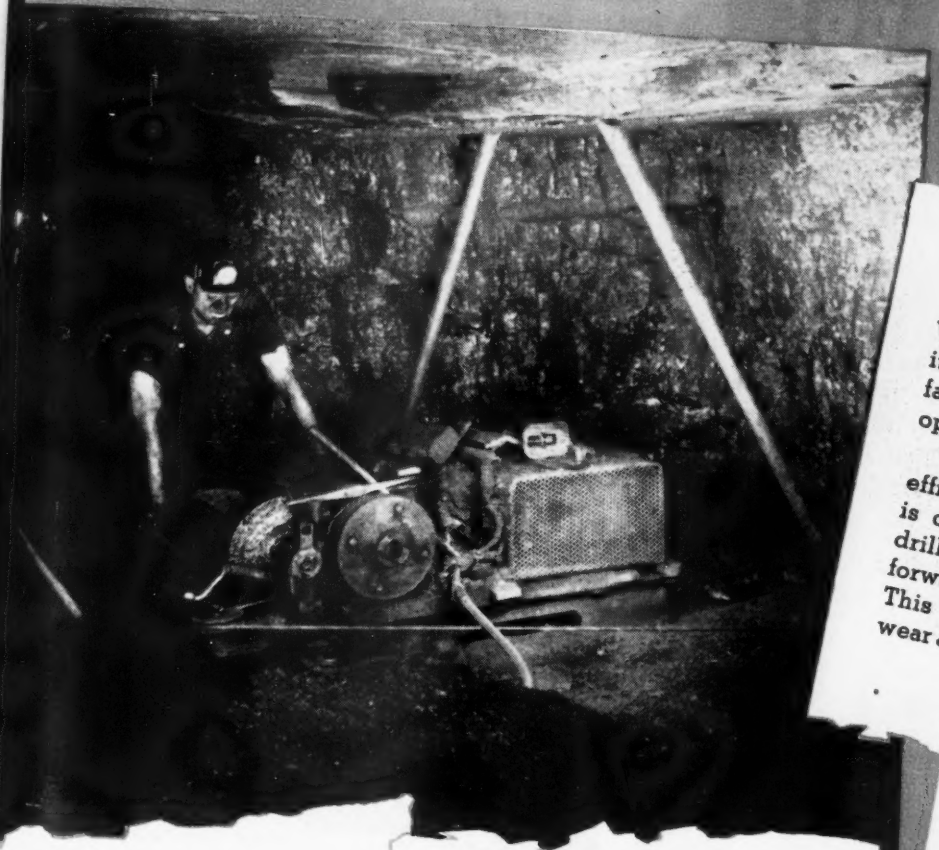
DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

CARDOX

"THE NON-EXPLOSIVE MINING METHOD"

HELPS MEET THE WARTIME TONNAGE CHALLENGE



INCREASING LOADABILITY . . .

Where coal is left standing, or where it is necessary to dig into a hanging face, loading machines can not be operated at maximum capacity.

When CARDOX is used, loader efficiency goes up. The charge of CO_2 is concentrated at the back of the drill hole, causing it to roll the coal forward in a loose pile of coarse sizes. This means faster loading . . . less wear and tear on the loading machine.

ELIMINATING TIME LOSSES . . .

Men are able to work more efficiently when coal is dislodged by the CARDOX Non-Explosive Mining Method. CARDOX does not produce smoke or noxious fumes. Its slow heaving action produces very little dust. Consequently work can be resumed immediately after the face has been dislodged . . . increasing the daily productivity of crews and machines.

OIDING ROOF AND RIB HAZARDS

The effect of a CARDOX discharge is mild . . . causing little disturbance to roof and rib structure. It logically follows that roof and rib hazards are decreased when the CARDOX mining method is adopted.

Consequently, CARDOX helps protect your vital labor supply against the hazard responsible for 51% of underground fatalities in bituminous mines.

MORE COAL PER FALL . . .

The extra *forward roll* of CARDOX-mined coal permits the use of longer cutter bars. This makes possible 16% to 50% more coal per face *at each cut.*

This means a saving of 16% to 50% of the non-productive time spent each day in moving the loading machine . . . more man-hours and machine-hours concentrated on work that results in vitally important tonnage.

ARDOX CORPORATION BELL BUILDING • CHICAGO 1, ILLINOIS

How to keep repairs down as tonnage quotas go up!

• How can you produce your share of the increased tonnage that war-demands are placing on the coal industry? How can it be done without a substantial increase in new equipment? It will take more than one answer to solve these two problems for you. But here are three suggestions that may help.

Try better lubricants—or more carefully chosen types and grades of lubricants—to reduce wear on equipment now operating two or three shifts.

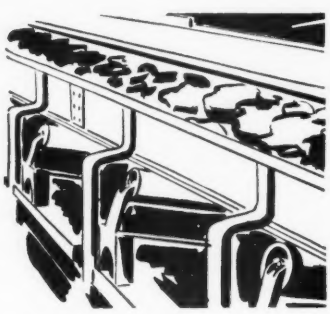
Try better methods of application to speed up the lubrication job and reduce machine time lost for servicing and repairs.

Try new lubrication schedules to meet the longer working schedules of equipment, and shorter periods that are available for servicing.

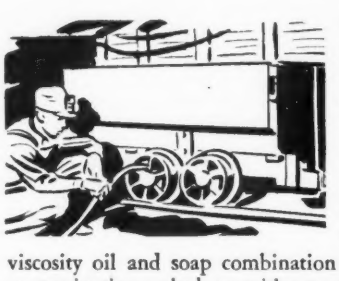
A Standard Lubrication Engineer can give you helpful suggestions on all three of these maintenance-reducing measures. His experience with these problems at other mines will be valuable to you. So will his knowledge of special mine lubricants described here. Call the local Standard Oil Company (Indiana) office, or write 910 S. Michigan Ave., Chicago 80, Ill. for the Engineer nearest you.

These lubricants can help save vital equipment

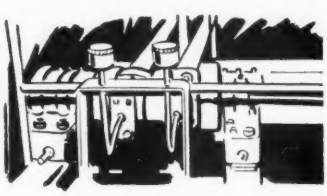
Loaders. Probably no other mine equipment is getting the punishment that your loaders must take to keep coal flowing out. They should be first on the list for a lubricating checkup. Standard's new line of Superla Mine Loader Lubricants offers six grades of thickened oils. These cover practically all the requirements for lubricating gear cases, transmissions, and gathering head pots, including older equipment which may require a heavy type lubricant. They all have good heat resistance and hold their body at operating temperatures. They also resist separation, thickening, sludging and caking—some of the problems you may meet because of forced production on your loaders.



Conveyors. Stuck or sluggish idlers or roller bearings increase conveyor belt wear and power consumption. Whether this is caused by the grease solidifying at low temperatures, or by separation of the oil and soaps in the grease, Superla Grease will correct the trouble. There's a grade of Superla Grease for practically every type of plain or anti-friction bearing and condition of operation.



Mine cars. Lubricant consumed by mine cars may not be a large item, but you can save considerable oiler time and haulage power by getting the right grade and quality of lubricant for your particular equipment. Stanolind Mine Car Grease (in four grades) has the right viscosity oil and soap combination to seal car bearings against contamination or leakage without sacrificing power.



Screen Eccentrics. Here's another trouble spot where good lubrication can save much oiler time and keep down repairs. It's another place where Superla Grease has eliminated overheating of bearings and leakage because it resists separation. Even under severe operating conditions, it has cut lubrication time and lubricant consumption as much as 50%.

Gasoline Powers the Attack . . . Don't Waste a Drop!

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

★ LUBRICATION ENGINEERING

How to reduce track-laying time

— even with inexperienced crews

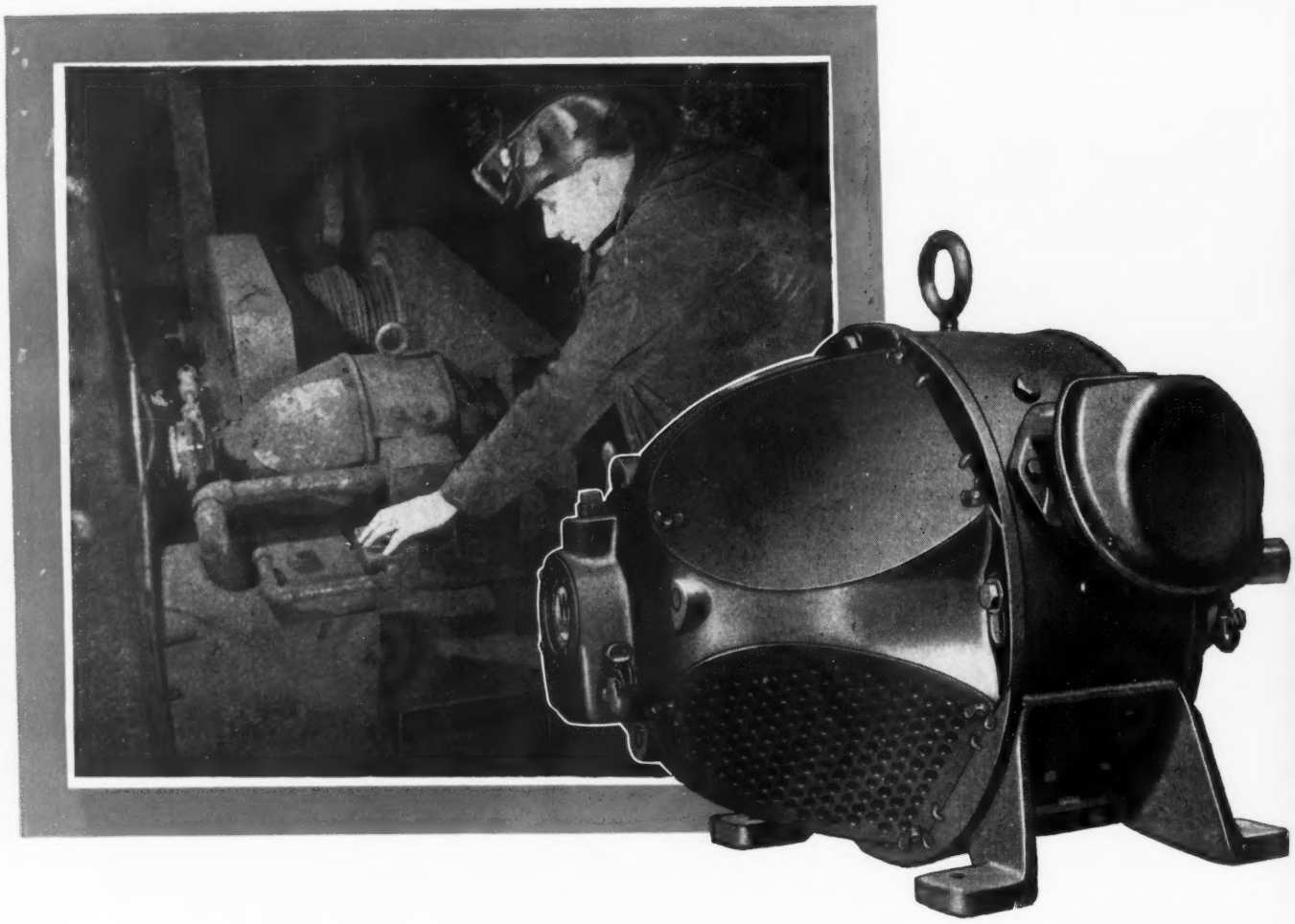
With the labor shortage acute, many mines are forced to spread their manpower thin. Experienced help is no longer plentiful for all operations. Yet even with a green crew, it's easy to lay mine track when Bethlehem No. 5 Steel Ties are used.

No spiking is required, for big, sturdy clips hold the rails in place. A hammer blow is all that's needed to knock each rotating clip over the rail flange. The clips provide automatic, permanent gaging—a time-saving feature that means genuine economy in hours and dollars both.

Bethlehem No. 5 Steel Ties are designed specifically for 40-pound rails. Weighing five pounds per foot of section, they're rugged enough to stand the beating dealt out by mechanized cutters and loaders, yet light enough to be handled easily by your track-laying crews.

For the heavier room track that is now so common, Bethlehem's No. 5 is a "must"—particularly where bottom conditions are not of the best. If you haven't yet tried these rugged, shock-resisting ties, why not investigate? They'll save you time . . . money . . . manpower.

No trick to it at all. No spiking, no gaging. A light blow knocks the clip into place —and the tie is held fast to the rail.



...twins born 32 years apart!

MORE WESTINGHOUSE SK MOTORS ARE USED IN COAL MINES TODAY THAN ALL OTHER MAKES COMBINED

AMPLE DESIGN—guts to carry the heavy loads—rigid one-piece frame with feet welded to frame to provide rigid integral foundation—uniform magnetic path aids commutation.

SPECIALLY DESIGNED INSULATION—field coils wound on rigid Micarta spool—vacuum-impregnated with hydrolene gum—eliminates air pockets. Mica-insulated armature coils—form-wound on all except the smaller ratings—protect against moisture or dust—prevent electrical breakdown.

EXCLUSIVE WESTINGHOUSE VESTIBULE SEAL—keeps lubricant in—dust and dirt out.

GREATER ACCESSIBILITY—brushes, brushholders and commutator readily accessible—permits easy brush adjustment or renewal—brushes readily "sanded-in".

WIDE RANGE OF RATINGS—from 1 to 200 hp to meet every mining requirement.

They may not look *exactly* alike, but the basic construction has never been changed—your SK Motor *never gets out of date,* for parts made today for the latest improved design will fit any SK Motor ever built of the same rating and frame. When you standardize on SK Motors, you automatically reduce maintenance problems and simplify replacement parts requirements—and you get performance which is unsurpassed for dependability. See your nearest Westinghouse representative, or write for Descriptive Bulletin 3500-1. Westinghouse Electric & Mfg. Co., Dept. 7-N, East Pittsburgh, Pa.

J-21303

Westinghouse

PLANTS IN 25 CITIES OFFICES EVERYWHERE

SK MINING MOTORS

General view of a large mine and coal processing plant at which a wide variety of S-A conveyors, feeders, etc., have been engineered into a highly efficient handling system. Tremendous tonnages of coal are handled by the over 3½ miles of S-A Belt Conveyors.

Over 3½ MILES

of S-A Designed and Built Conveyors Speed Handling at This Modern Plant

Whether your operations require the moving of coal over great distances . . . or over runs measured in comparatively few feet . . . you will find Stephens-Adamson qualified to help you reach that all important goal—*lowest handling cost per ton.*

S-A manufactures *conveyors* of all types, *elevators, screens, feeders, crushers* and a complete line of *power transmission equipment* . . . all vitally important to the many phases of mining operations.

In addition, S-A incorporates machinery units into efficient economical handling systems designed to meet your particular requirements. Consult S-A on present and future coal conveying problems.

STEPHENS-ADAMSON MFG. CO.

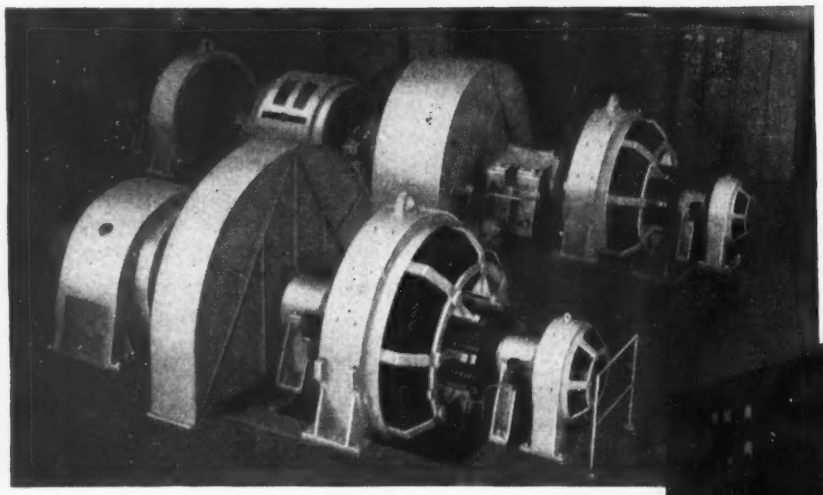
6 RIDGEWAY AVENUE, AURORA, ILLINOIS — LOS ANGELES, CALIF. ★ BELLEVILLE, ONT.

Designers and Manufacturers of All Types of

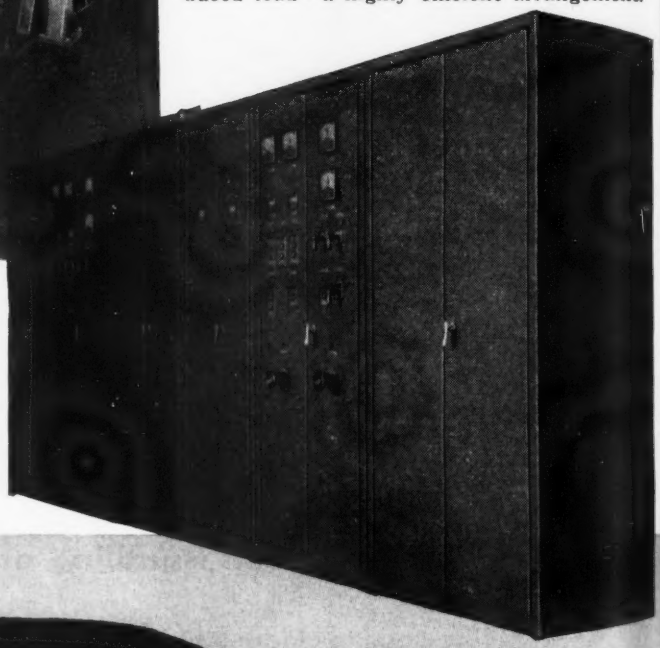
BULK MATERIAL HANDLING EQUIPMENT

26,000 lb... 3500 ft...

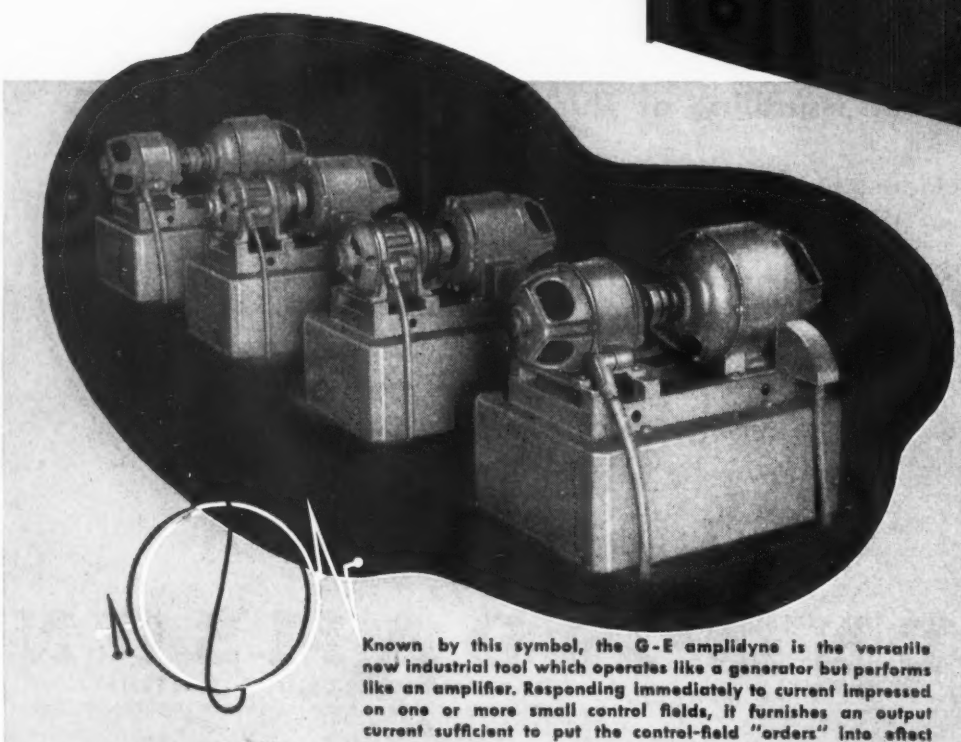
New G-E hoist drives with amplidyne control are quick on the up-take, easy on power peaks



(Left) *Tomorrow's top-notch hoist drive* starts with a motor-generator group like this. In background, two 1250-kw generators are driven by a single 2500-hp G-E motor. A 50-ton flywheel reduces peak-load power demand by more than 50 per cent. In foreground, an identical generator is driven by a 1250-hp motor. Power for both hoists can be provided by individual generators on the dual-ended unit when the main hoist is operating at reduced load—a highly efficient arrangement.



(Right) *Simplicity of control mechanism* made possible by the amplidyne is exemplified by these compact metal-enclosed panels. They contain the protective and regulating devices for the two d-c hoist systems.

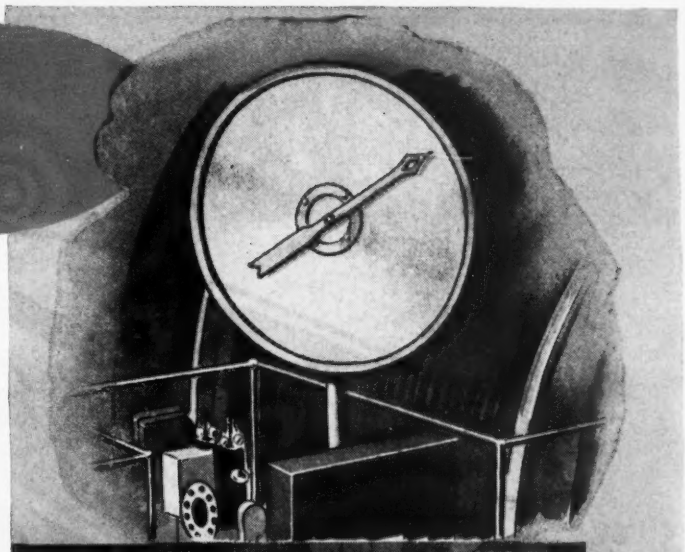


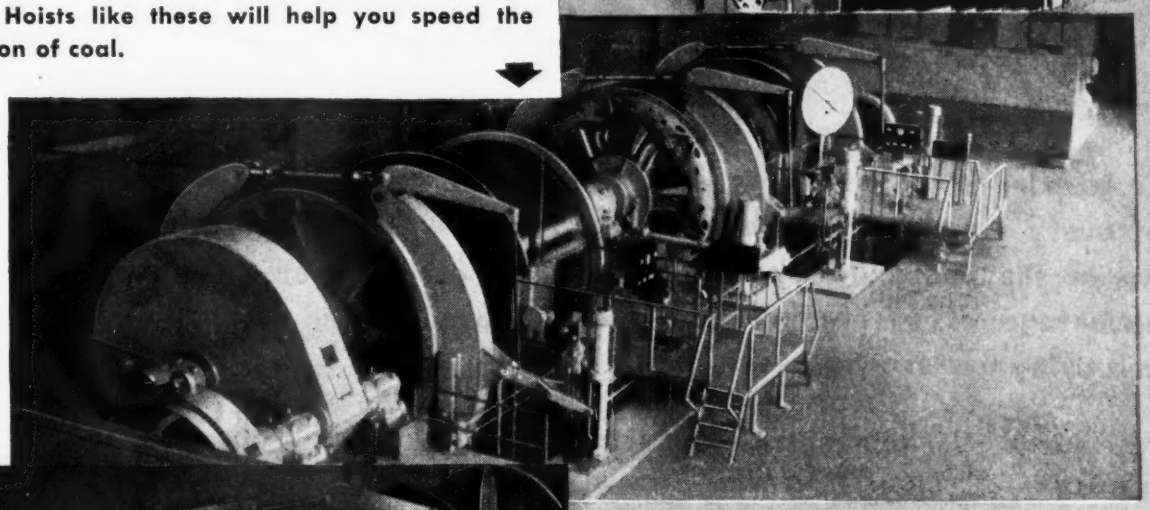
Known by this symbol, the G-E amplidyne is the versatile new industrial tool which operates like a generator but performs like an amplifier. Responding immediately to current impressed on one or more small control fields, it furnishes an output current sufficient to put the control-field "orders" into effect instantaneously.

(Left) *Small but mighty,* the two outer units are G-E amplidynes—the key to the fast response and low-cost operation of the hoists. Operating as exciters, they greatly simplify efficient control of generator voltage within a safe current limit. Acceleration is fast, for the "forcing" action of the amplidyne continually holds the load (horsepower) at a safe maximum despite rapidly changing speeds. During shaft sinking, the system gives full control of the speed of heavy down-going loads of steel and concrete without counterweight and with very little use of mechanical brakes. (Center units are dynamic braking exciters that bring the motor-generator sets quickly to rest as they are shut down.)

100 seconds!

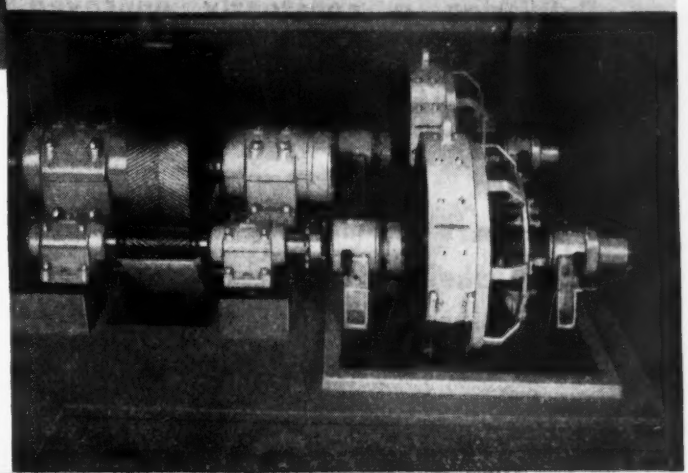
Here are two newly installed G-E hoist drives, each a pacemaker. Teamed up with the 3000-hp main hoist is a 1500-hp man-and-material hoist. Drive units for both are alike—one dual, one single—with three identical d-c hoist motors and identical d-c generators. Both hoists gain in responsiveness, simplicity, and efficiency because of their amplidyne control. Hoists like these will help you speed the production of coal.





(Above) ***The pattern of the future*** **in mine-hoist installations is here shown on the job today. In foreground is the man-and-material hoist, driven by a single 1500-hp motor. Behind it is the main 3000-hp hoist, designed to raise 360 long tons per hour from a 3500-ft depth, with a maximum speed of travel of 2400 ft per min.**

(Above) ***Motor drive*** for the smaller hoist—the G-E 600-rpm, 600-volt d-c motor operates a double-deck cage (12,000 lb) and a 15,000-lb load at speeds up to 2000 ft per min. (Counterweight, 19,500 lb)



(Right) The other two 1500-hp, d-c motors, geared to the double-drum main hoist. All three drive motors put into action the fast reponse and load-forcing characteristics of amplidyne control.

GENERAL ELECTRIC COMPANY, SCHENECTADY 5, N. Y.

657-34

GENERAL ELECTRIC

BUY WAR BONDS

WE MUST

A Better

To keep in step with the new demands of every prospective buyer of fuel, we of the coal industry must take advantage of every technique for improving our product.

Too many coal operators — even in the thirties—felt their markets were pretty well "sewed up." But the diesel boys—the oil burner enthusiasts—the water power bureaucrats—the natural gas promoters are not going to admit it.

Delivering a constantly improved product is the ONLY way for the industry to keep its markets "sewed up."

Operators should be thinking *now* about their future markets — and that's where ALLEN & GARCIA specialized mining engineering comes in. Although we are busy too with vital war producing activities, we have not lost sight of the future needs of our industry.

Complacency has no place in the make-up of any operator who expects to continue operating at a profit. Improved buying technique and better utilization lead to but one inevitable conclusion, namely — THE MARKET WILL GO TO THE PRODUCERS WHO DELIVER GREATER B. T. U. VALUES WITH UNIFORM CHARACTERISTICS AT THE LOWEST COST.

And the only way in which those values can be delivered is through the medium of efficient mechanized mining, coupled with effective preparation. Just installing a loading machine and a couple of vibrating screens is not enough.

Where are *your* major opportunities for raising efficiency, cutting costs, and improving quality? These questions have been favorably answered by the ALLEN & GARCIA COMPANY for many producers. May we seek the answers for you?

DELIVER

PRODUCT . . .

SCOPE OF *Services*

- Design and construction of new plants and their various units
- Organization, operation, and management of mines
- Below ground modernization and mechanization
- Reconstruction, revamping, or improvements of existing plants
- General consulting work regarding power, equipment, operation, and various mining problems
- Valuations for financing, fire-loss, taxation purposes—reports and appraisals

We work with an undivided responsibility to you, at a fixed fee. We are not hampered by any connections which might prejudice the true professional engineering approach to the problem.

ALLEN & GARCIA COMPANY

CONSULTING AND CONSTRUCTING ENGINEERS

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Among the Latest Gelatinous Permissible Powders is . . . NAPCOGEL

POWDER NATIONAL COMPANY

Napcogel has extraordinarily high water resistance. It is a good "Rocker" in headings, tunnels, or shafts where gas and/or dust is present.

Napcogel has the following outstanding qualities:

- Class A Fumes.
- A stick count of 208. 1¼" x 8" cartridges per 100 pounds.
- Its speed is 17,000 feet per second.
- Its weight strength is 65%, and its bulk strength is 65%.

◆

Napcogel is but one of ten Permissible Powders manufactured by National. Millions of pounds of National Permissibles are being used annually by some of the representative operators East of the Mississippi River.

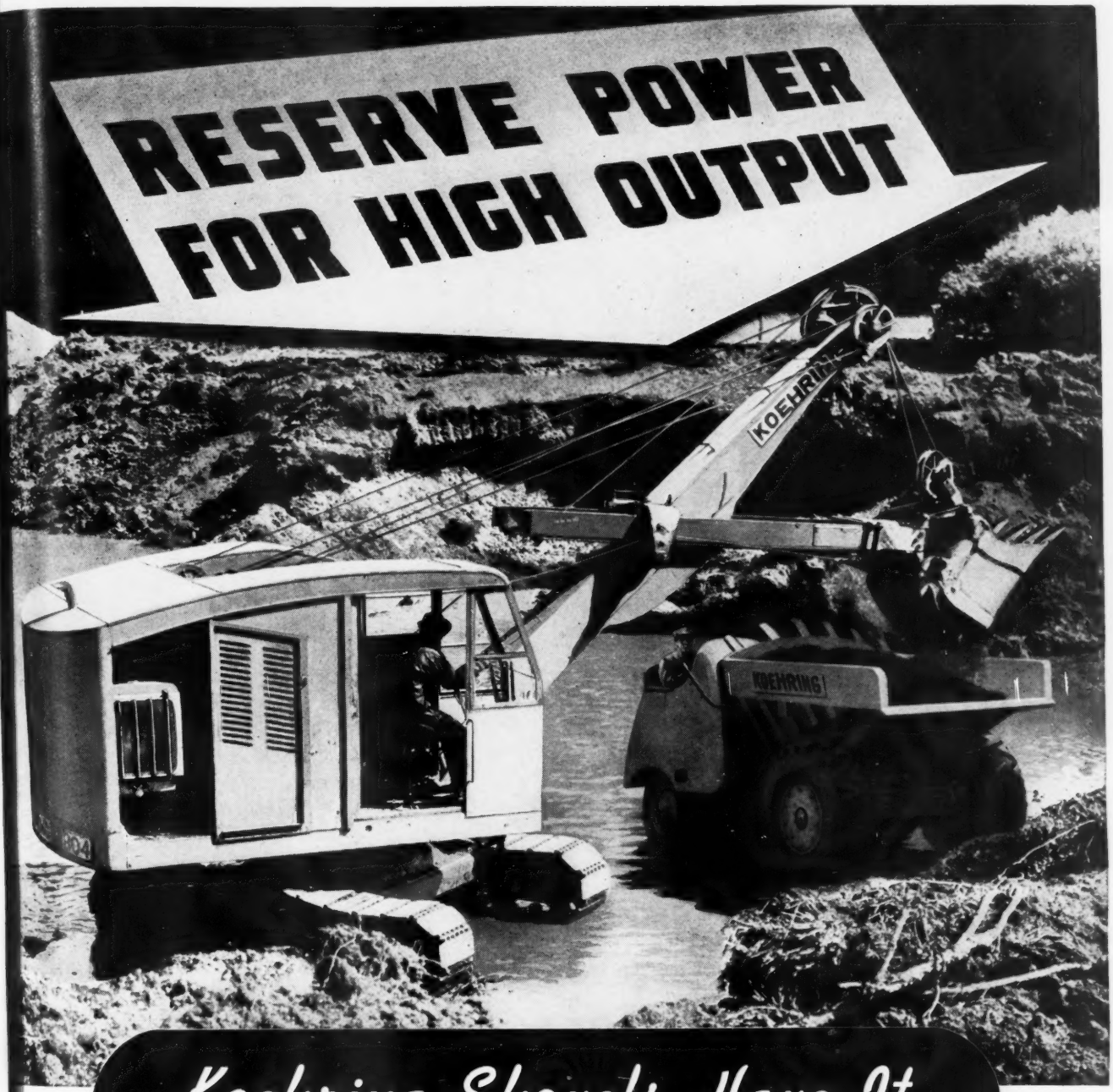
Not Living on Our Reputation but Building It!

NATIONAL POWDER COMPANY

ELDRED (McKean County) PENNA.

Manufacturers of High Explosives for All Industrial Purposes

RESERVE POWER FOR HIGH OUTPUT



Koehring Shovels Have It

Koehring shovels have the reserve power and the stamina to take the extra burden of 'round the clock performance day after day. The extra speed which has helped them set output records on ordinary work is now helping to do the extraordinary job required. Sustained output is assured by the ability of Koehring shovels to take hard service with little time out for breakdown or repair. These features keep Koehring shovels digging hard; all welded construction . . . chain crowd . . . self-cleaning crawlers . . . heavy duty motor . . . welded dipper . . . and many more.

KOEHRING COMPANY • MILWAUKEE, WISCONSIN

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

lowering McNally-Norton Washer into position in washing plant under construction

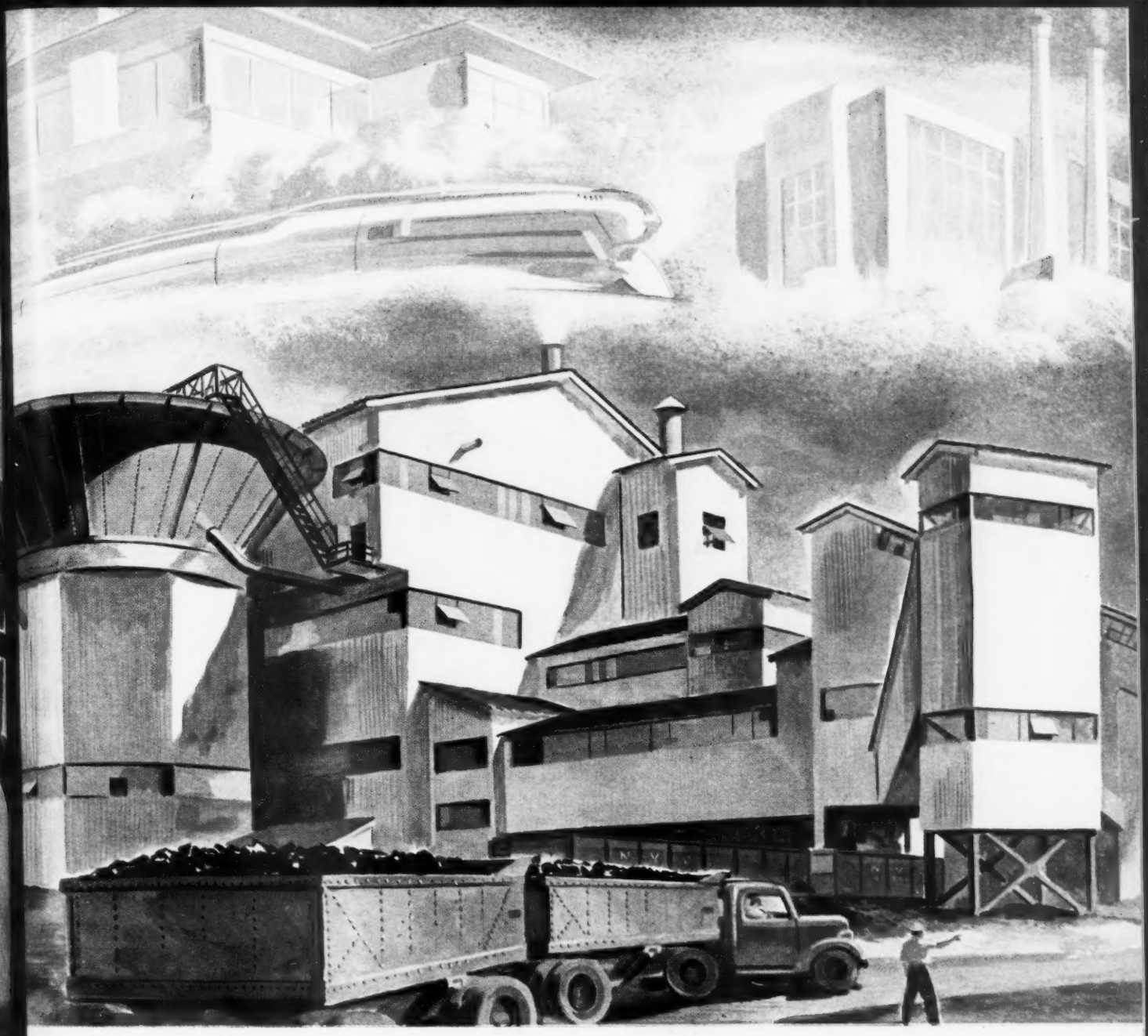
Sturdy construction FROM THE GROUND UP

LOWERS OPERATING COSTS

Over 10 million tons of washed coal produced in Sahara plant in 7 years

Raw coal from strip and deep mines enters the Sahara Coal Co
pany washing plant and is taken apart mechanically by crushing, was
ing, and grading. Then by carefully blending, the coal is put togeth
again to meet the exact specifications of a variety of customers. T
complete preparation cost to produce this outstanding cleaned co
tonnage is only a few cents per ton. Our technical staff has mu
interesting operating data to discuss with mine production offici

McNally Pittsburg Manufacturing Corporation, Pittsbur



Prescription Coal Brings Premium Prices

FACE to face with keen competition, the executives of this company did something about it! They put in a washery in which they could manufacture coal to meet every specification. Within the walls of this huge plant, coal becomes *prescription fuel* . . . to run the "crack train of the United States" . . . to generate electric energy in great public service stations . . . to run mighty industrial plants . . . to heat offices, schools, public buildings, apartments, and homes.

Run of mine coal enters the great jaws of giant crushers and is reduced to proper sizes for washing. From there it is conveyed rapidly to screens where it is sized automatically. Then to massive washers, where it is submerged in rapidly pulsating water to separate the coal from impurities.

The larger sizes automatically flow the short way to waiting railroad cars. The smaller sizes follow the more circuitous route through driers to remove moisture before loading into railroad cars.

When the whistle blows at the end of the day, carload after carload of washed coal in many different prescription grades is on its way to waiting markets.

A McNally Pittsburg washing plant will enable you to get in the premium price market and stay in it. Our technical staff will discuss the possibilities with you, based upon a survey of your own property.

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

(Reproduction of Advertisement to appear in July Fortune Magazine)

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P&H ANNOUNCES IT CAN BE DONE!

AC and DC Welding with the Same Electrodes!

You've waited for this — electrodes that perform equally well on AC or DC! They're ready — not one, but *two* such electrodes — to simplify buying — to save your time and money with an arc that's extremely stable and easily controlled. Thoroughly proved in use and by exhaustive tests, these electrodes are ready to serve you better. Prove them to yourself *now* with a trial order.

AC-1
E-6010 and E-6011

For AC, and either polarity on DC

Tensile strength, 65,000 — 70,000 P. S. I.
Yield, 55,000 — 60,000 P. S. I.
Ductility, (2") — 25% to 35%.
Available in all sizes — 14" and 18" lengths.

Conforms to requirements of:

U. S. Navy Bureau of Ships specifications 46-E-3 Grade 3, Class 1, 2 and 3.
Hartford Steam Boiler and Insurance Company.
American Bureau of Shipping.
Lloyds Register of Shipping.

Full information and procedures on request.

AC-3
E-6012 and E-6013

For AC, and either polarity on DC

Tensile strength, 65,000 — 70,000 P. S. I.
Yield, 55,000 — 60,000 P. S. I.
Ductility, (2") — 18% to 25%.
Available in all sizes — 14" and 18" lengths.

Conforms to requirements of:

Hartford Steam Boiler and Insurance Company.
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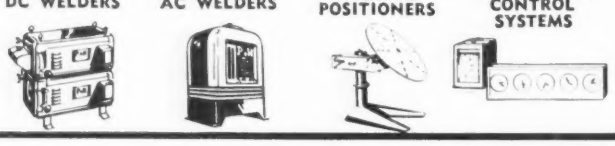
Full information and procedures on request.

60 YEARS OF SERVICE 1884-1944

A COMPLETE ARC WELDING SERVICE

DC WELDERS | AC WELDERS | WELDING POSITIONERS | PRODUCTION CONTROL SYSTEMS



General Offices:
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HARNISCHFEGER CORPORATION
WELDING ELECTRODES - MOTORS - HOISTS P&H ELECTRIC CRANES - ARC WELDERS - EXCAVATORS

Canadian Distribution: The Canadian Fairbanks-Morse Co., Ltd.

TIGER BRAND has earned its service stripes

OUR ships, planes and mechanized fighting equipment have shown the world what American ingenuity can do when put to the test.

Wire rope, indispensable in the construction and operation of these implements of war, has taken on one unusual assignment after the other. Particularly is this true of American TIGER BRAND.

Not only have our engineers provided the fighting forces with TIGER BRAND to meet exacting requirements, but our shop forces, working around the clock, have turned out wire rope in quantities that would ordinarily have been thought impossible.

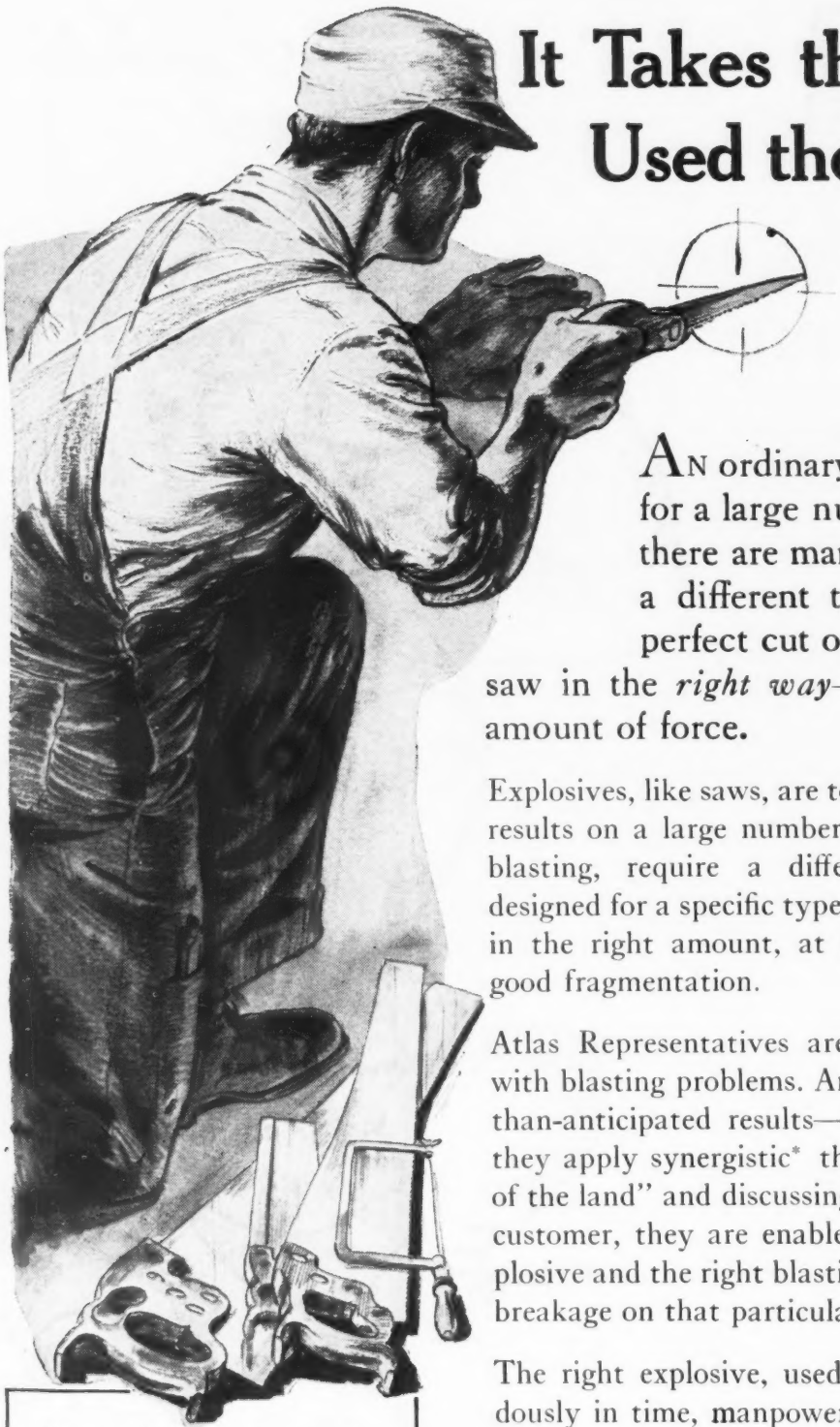
In making TIGER BRAND for war, we have learned two important things—how to turn out high quality wire rope fast, from new and better steels—and how to adapt it successfully to many new uses.

This hard-earned knowledge will insure top efficiency when you apply TIGER BRAND in domestic service. Today, a steadily growing amount of TIGER BRAND is becoming available for use here at home. So, when you need wire rope—and want the best—give us a call.

Excellay Preformed

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York
COLUMBIA STEEL COMPANY
San Francisco
For Anthracite Service: Miners Bank Building, Wilkes-Barre, Pa.
United States Steel Export Company, New York

UNITED STATES STEEL



It Takes the Right Saw Used the Right Way!

AN ordinary crosscut saw can be used for a large number of sawing jobs. But there are many kinds of saws—each for a different type of job. You get the perfect cut only when you use the *right* saw in the *right way*—and apply just the right amount of force.

Explosives, like saws, are tools. Some explosives give good results on a large number of jobs. Other jobs, for good blasting, require a different explosive—an explosive designed for a specific type of shot. Use the *right* explosive in the right amount, at the right place—and you get good fragmentation.

Atlas Representatives are constantly aiding customers with blasting problems. And to give the customer better-than-anticipated results—"2 plus 2 equals 5" results—they apply synergistic* thinking. By analyzing the "lay of the land" and discussing ideas back and forth with the customer, they are enabled to recommend the right explosive and the right blasting formula for the best possible breakage on that particular job.

The right explosive, used the right way, saves tremendously in time, manpower and equipment use.

Have YOU a blasting problem you'd like us to tackle? Consult Atlas.

***Synergism:** The force that produces "2+2=5" results when both you and we get together and really "click."*

ATLAS EXPLOSIVES

"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco

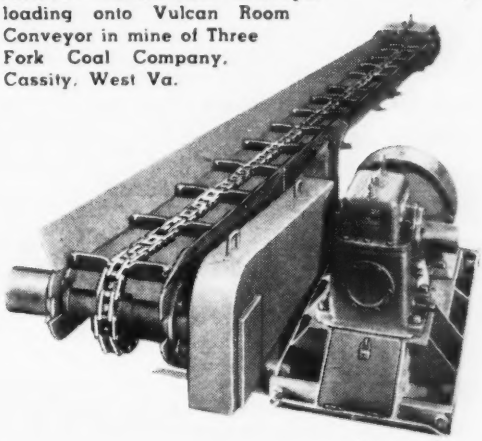
"MIGHT BE A LITTLE OVERLOADED, BUT

Vulcan Chain Conveyors
ARE BUILT TO TAKE IT"

WE don't recommend piling the coal up quite so heavily—even on a Vulcan Chain Conveyor—as the boys at the Three Fork Coal Company did when the photograph reproduced above was taken. But we know it often happens, so we build an extra margin of strength into every working part to take care of just such extra heavy loads. If anything MUST go it's usually the shear pin in the head sprocket, which can easily be replaced.

Write us regarding any requirement for underground conveyors—either Chain or Shaking Chute. We manufacture both types in a wide range of sizes, together with a complete line of Chutes, Rollers, Jacks and other modern accessories. Illustrated bulletins mailed promptly on request.

ABOVE: Vulcan Face Conveyor loading onto Vulcan Room Conveyor in mine of Three Fork Coal Company, Cassity, West Va.



VULCAN ROOM CONVEYOR with fully-enclosed speed-reducing drive unit and electric motor of any required type or size.

VULCAN IRON WORKS

Established 1849

Main Office and Works WILKES-BARRE, PA., New York Office 50 Church St.

Heavy Duty Electric Hoists
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Scraper Hoists
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geared and electric drive
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Crushing Rolls and Pulverizers
Briquetting Machines
Ball, Rod and Tube Mills

This year – 25,833 Brooklyn Bridges !

There is only one Brooklyn Bridge. It is a mile long, and weighs 24,000 tons.

Yet, this year the nation will need the equivalent in weight of 25,833 Brooklyn Bridges – meaning, about 620,000,000 tons of bituminous coal.

Just where will this coal be needed?

About 125 million tons of it will be needed to heat at least 41% of the nation's homes next winter.

At least 115 million tons will be needed to power the railroads. A ton of coal is required to produce each ton of steel. Bituminous coal is essential to the manufacture of plastics, war chemicals and high explosives, and 62% of the electric power that runs our industries comes from it.

That's how important bituminous coal is and that is why the bituminous producers, with a full sense of their responsibility to the nation, to their customers and to the men who work for them, say:

"Nothing must be allowed to interfere with the steady output of bituminous coal – America's vital fuel."

BUY MORE WAR BONDS

BITUMINOUS COAL *Institute*

60 East 42nd Street, New York 17, N. Y.

"WHAT WOULD YOU LIKE TO KNOW ABOUT COAL?"

Here are a few of our answers to the questions you have asked about coal, and the men who mine it.

How much money can a coal miner make?

In December 1943, bituminous coal miners earned an average of $52.85 per week. An inside miner who works 48 hours a week will earn a minimum of $57 a week. This varies up to $73.36 a week in cases where the base wage is $9 a day. Piece-workers can earn as much as $600 a month. The miners' take-home pay tops that of other workers in non-manufacturing industries, which in December 1943 averaged $37.43 per week.

Can a coal miner advance himself?

That depends on the man himself. Most important mine officials have come up through the ranks. A great many mines have training programs to fit men for better jobs. Schools and universities offer extension courses on the technical side of mining. A miner who shows promise is always encouraged to advance himself.

The same organization that produced the famed U. S. Royal Mining Machine and Locomotive Cables has given new proof of American resourcefulness. U. S. War Type Mining Machine and Locomotive Cables are admirably meeting today's emergency needs. Because they are made in the same plant, with the same equipment, to equally exacting standards of scientific skill, you can depend on them for satisfactory performance.

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"Here's Our Line"... says *Rōmey

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(In rounds, flats and squares)

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WEATHERPROOF WIRE and CABLE
- U.R.C.
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RUBBER COVERED WIRES and CABLES
- Solid or Stranded
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- Heavy Duty
- Arc Welding
- Mining Machine
- Locomotive
- Gathering
- Service Entrance
- Lead Covered

MAGNET WIRE
- Cotton
- Asbestos
- Paper
- Enamel
- Glass

SYNTHINOL BUILDING WIRE

SYNTHINOL MACHINE TOOL and CONTROL WIRE
(Thermoplastic Synthetic Insulated)

FLEXIBLE CORDS
- Radio Wires
- Cord Sets

AUTOMOTIVE WIRES and CABLES
- Ignition
- Starter
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Are you giving any thought to the cranes, shovels and draglines you will be needing for the big jobs being planned for the future.

It is none too soon to start taking stock of your excavator and material handling requirements. Only those with modern and efficient equipment can compete for the tremendous amount of work that must be done after Victory.

There is a LIMA designed and built for the job to be done, whether it be highway construction, metal and coal mining, sand, gravel and quarry work, levee work or any other kind of material handling projects.

LIMA LOCOMOTIVE WORKS, INCORPORATED
Shovel and Crane Division - - LIMA, OHIO

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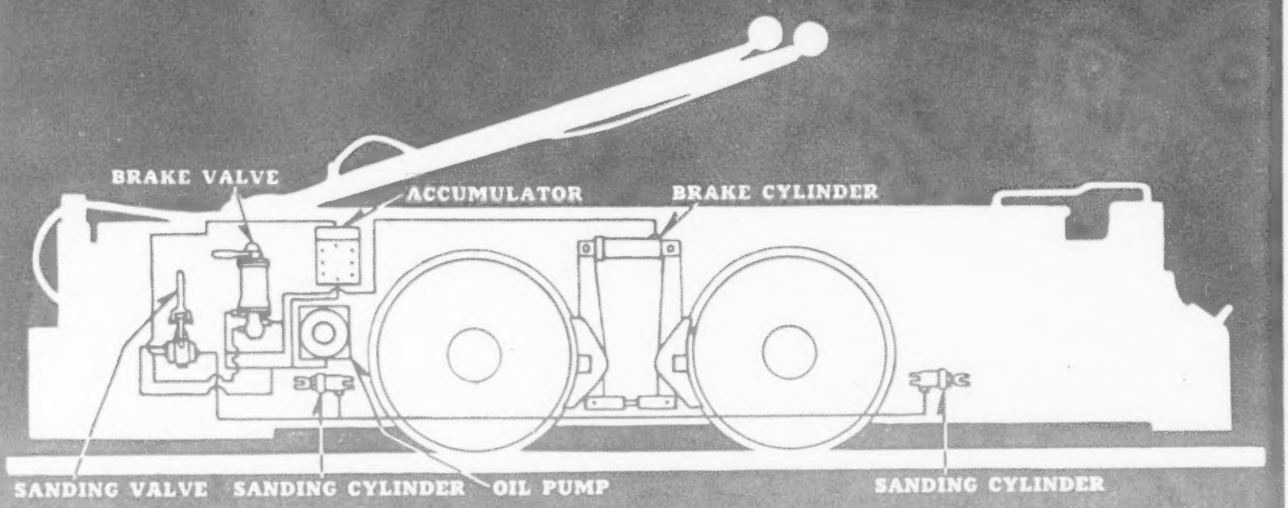
SHOVELS, ¾ YD. TO 3½ YD. CRANES, 13 TONS TO 65 TONS
DRAGLINES, VARIABLE

Outline for Greater Production



WESTINGHOUSE Hydraulic Brake

IN OUTLINING greater production goals, think of the big lift that can be had with this power brake.

On your present locomotives it would handle the extra loads that might require an additional locomotive—if it could be had.

Handling ease would take fatigue off the operator—keep him alert through the extra hours.

And, best of all, it would take the braking load off the motors—keep them in service and reduce repair bills.

Easily Applied to Old Locomotives

WESTINGHOUSE AIR BRAKE CO.

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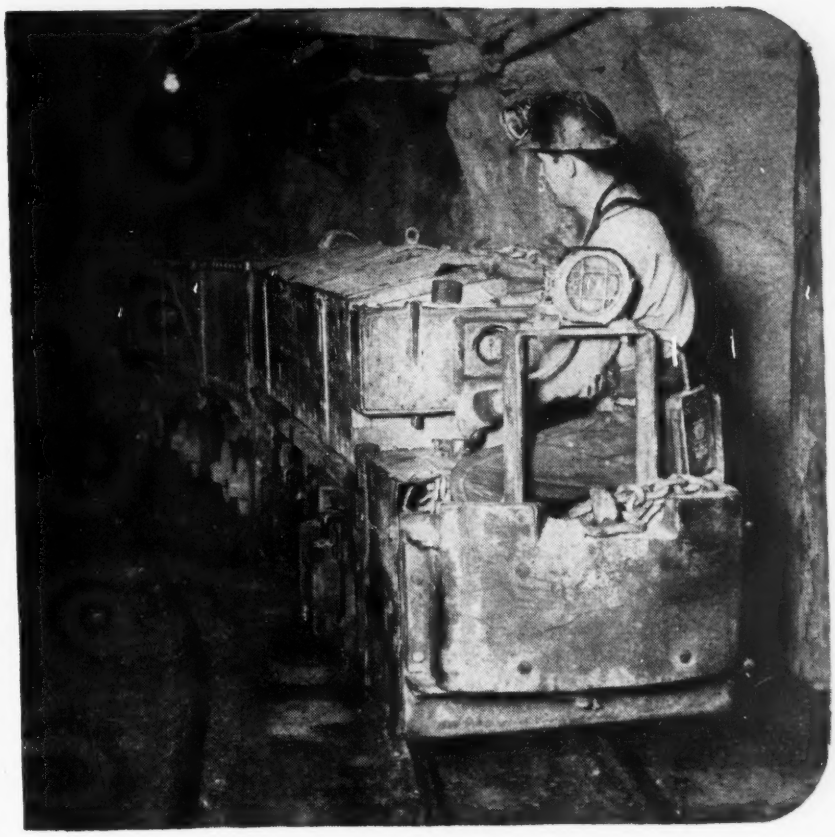
THEY EVEN SURVIVE WRECKS

Edison Alkaline Batteries in mine locomotives and shuttle cars have survived so many wrecks with little or no damage — and then have gone on to deliver full service life — that maintenance men no longer are apt to get excited when they see damaged trays of cells come into the shop.

They usually just test, reassemble, and send out again. They *expect* them to stand up simply because they have seen them do it so often, and have learned that the steel cell construction of alkaline batteries has no equal for rugged strength.

Yet their durable mechanical construction is only one of a number of reasons why alkaline batteries are dependable, economical power units. They can be fully charged in 6 to 7 hours direct from the d-c. power supply; do not require critical rate regulation; give longer life than any other type of battery; can be laid up indefinitely without injury; can be ventilated rapidly for high-temperature operation, yet are not damaged by freezing.

Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, New Jersey.



LOCOMOTIVE FALLS 170 FEET;
BATTERY STILL TESTS O. K.

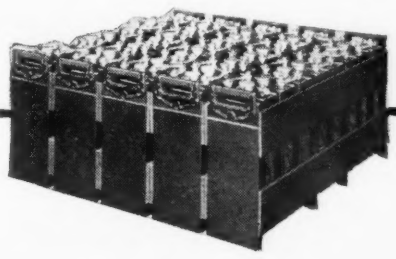
A worker was unloading steel near the top of a mine shaft. A trammer was in the way. He did not know how to move it but he saw the controller handle and shoved it on.

The trammer headed for the shaft, smashed through the gate, fell down the shaft, and stopped just above the 200 level, a drop of 170 feet.

The alkaline battery in the trammer required a few external repairs but all the cells tested O. K. so it was returned to service. It was then five years old. It later delivered an additional eight years of service.

The fact that alkaline batteries can withstand such accidents, illustrates the extra dependability that they deliver under more normal conditions.

TYPICAL 40-CELL BATTERY FOR SMALL TRAMMER

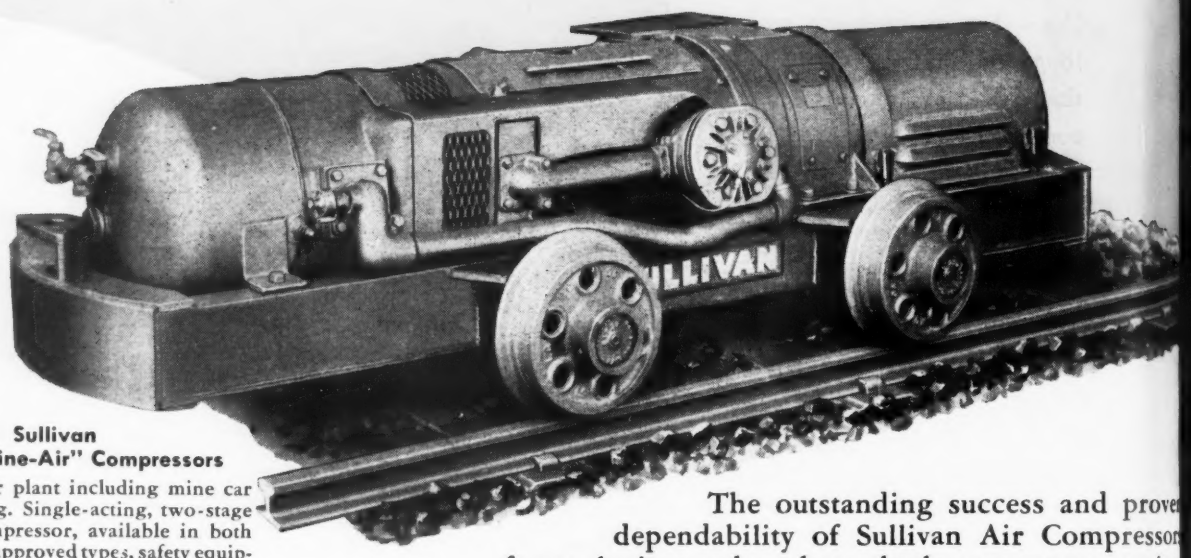


Edison

ALKALINE BATTERIES

For mines tha

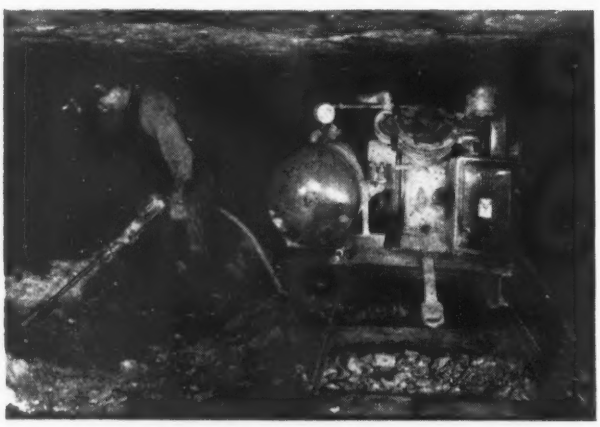
"MINE-AIR" COMPRESSOR



Sullivan
WK-29 "Mine-Air" Compressors

A complete air plant including mine car truck mounting. Single-acting, two-stage air-cooled compressor, available in both open and gov. approved types, safety equipment meets mine regulations. Panel-mounted controls and automatic regulation standard on all models. Rugged, efficient, compact, low height makes WK-29 suitable for use in almost any location.

The outstanding success and proven dependability of Sullivan Air Compressors for coal mine use have brought these compressors into prominence in modern mines. Attention has been focused especially on the WK-29 "Mine-Air" Compressor, a complete streamlined unit mounted on its own frame and wheels, and on the DeLuxe WK-30 which is a self-propelled unit equipped with both trolley pole and cable reel. In addition, there is the WL-70 Compressor unit for mines that want to mount a compressor, with a receiver, on a standard mine car. For complete information on any of these, write your nearest Sullivan office.



WL-70 Unitair (Compressor only)

A single-stage compressor to be mounted on a mine car in mine's own shops. A dependable, mobile source of air power for use in mines where air demand is small (or as supplementary equipment). Micro-lift valves, built-in aftercooler, automatic regulation; v-design permits easy, quick valve inspection. Completely air-cooled, no water connections. Three models in displacements from 96 to 144 C.F.M., at 100 lbs. pressure.

Specifications of Sullivan Mine Car Compressors

TYPE	MOUNTING	CAP. AT 100 LB. PRES.	SIZES AVAILABLE	HEIGHT	NO. STAGES
WL-70	Mounted at Mine	96-144-CFM	3	2' 9" Above truck	Single stage
WK-29	Built as a unit at Sullivan on mine car	85-120-CFM	2	2' 3" to 2' 4" Above rail	Two stage
WK-30	Built as unit at Sullivan and self-propelled	120-CFM	1	3' 10" Above rail	Two stage

SULLIVAN
AIR COMPRESSORS AND DRILLS

are Modern!

HAND-HELD ROCK DRILLS

Wherever Sullivan Hand-Held Rock Drills have been used, they have established unequalled records for footage drilled, for economy of power consumption, for marked reduction in maintenance costs, and for dependable service. Much of the success of these drills is attributed to the unique and exclusive Sullivan dual-valve construction, as well as to the characteristic ruggedness of Sullivan design. Sullivan Machinery Co., Michigan City, Indiana. *In Canada:* Canadian Sullivan Machinery Co., Ltd., Dundas, Ontario.

L-47. Easy-holding 45-lb. drill gives 55-lb. performance. Added speed and drilling power make it invaluable in all coal mining operations. Ask for Bulletin 87-B.

L-1. A 30-lb. hand-held drill for shallow holes. Ample cutting speed and capacity for drilling coal in strip pits. Used underground for taking up bottom, trimming sidewalls, drilling hitches and cutting overcasts or breakthroughs. Ask for Bulletin 87-H.

L-2. A perfectly balanced 45-lb. drill combining low air consumption, fast drilling speed and economy of operation. Well suited for drilling rock in coal mines and strip pit operations. Ask for Bulletin 87-O.

L-57. 57-lb. drill for drilling holes to 16 feet under average conditions. Fast drilling in all materials makes it essential in all strip pit operations. Ask for Bulletin 87-H.

K-81. 81 lbs. of powerful breaking ability. For breaking up large rock slabs when taking top or bottom, or when cutting drainage ditches along main haulageways. Some mines use to dislodge wet, sticky coal from cars.

ARMY-NAVY

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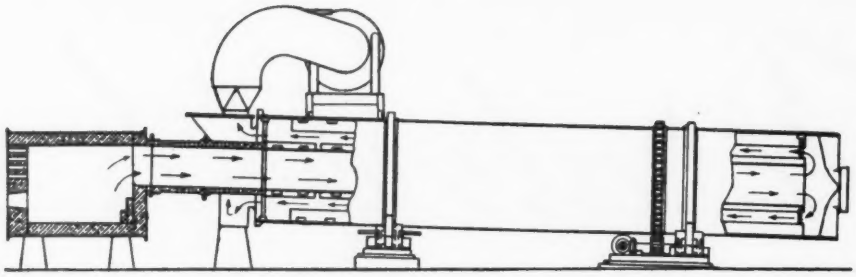
DUCTS: Coal Mining Machines • Scraper Haulers • Rock Loaders • Hoists • Car ... • Air Compressors • Coal Drills • Rock Drills • Cutter Bit Sharpeners and Heaters • ...Drills and Contract Core Drilling.



EFFICIENT DRYING

with the

"Ruggles-Coles" Rotary Dryer

A heat dryer is capable of removing all the surface moisture from washed coal. Usual practice is to go down to 1 or 2 percent.

Over 225 Ruggles-Coles Dryers have been installed for drying all types of coal. Below is listed some operating data taken from our files:

Class	*Diameter*	*Type Coal*	*Capacity Tons per hr.*	*Original Moisture*	*Final Moisture*
XA-4	54"	Anthracite	9.3	8.0	1.2
XA-8	60"	Bituminous	11.1	11.0	1.8
XA-10	70"	"	16.5	8.1	0.9
XA-12	80"	"	18.0	10.0	1.0
XA-14	90"	Anthracite	25.5	12.3	1.2
XA-18	104"	"	40.0	10.0	1.0

The class "XA" Ruggles-Coles Double Shell Rotary Dryer has a higher thermal efficiency than that of any other dryer since the hot gases of combustion, in traveling through the inner shell, dry the wet coal showered on the tube. The gases then return in the outer shell in contact with the coal at greatly reduced temperatures.

Bulletin 16-C

HARDINGE

COMPANY, INCORPORATED - YORK, PENNSYLVANIA

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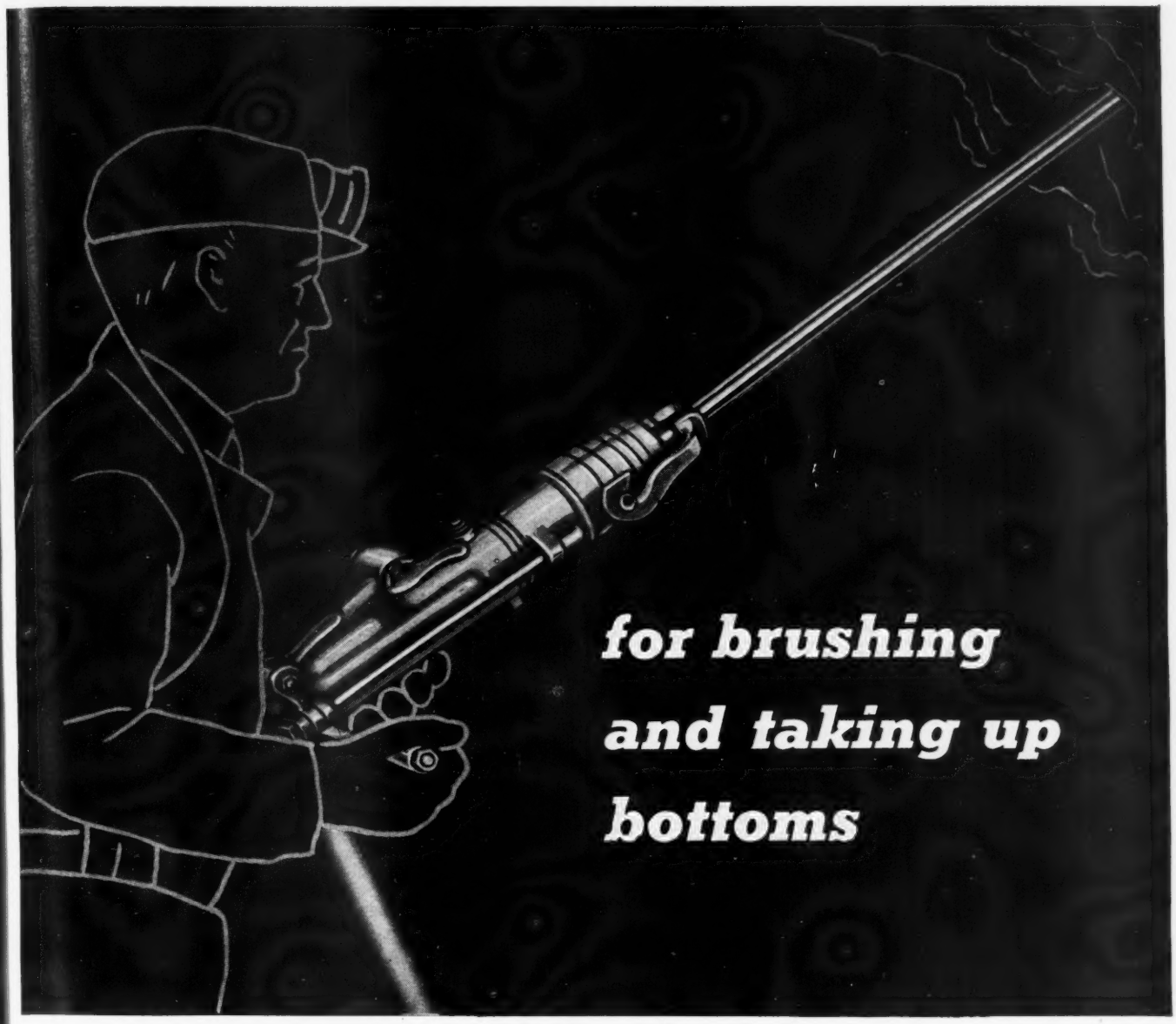

CP-32 SINKER – a time-saver in the mine

LIGHTNESS, balance and easy control combine to make the CP No. 32 Sinker a real one-man drill for brushing, taking up bottoms, and utility drilling in the anthracite region, or wherever conditions require rock drilling.

The high speed, penetrating blow and effective hole-cleaning of the CP No. 32 Sinker reduce drilling time to a minimum. A fully cushioned piston, plus bushings at points of wear, and automatic lubrication insure long life and low maintenance. Low air consumption makes the CP No. 32 Sinker Drill ideal for operation with portable air compressors.

The CP No. 32 is only one of a long line of dependable Sinker Drills, Drifters and Stopers. Write for full details.

★★★★★★★★★
PNEUMATIC TOOLS
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(Hicycle...Universal)
ROCK DRILLS

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★★★★★★★★★
AIR COMPRESSORS
VACUUM PUMPS
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FIT THE VALVE TO THE SERVICE

WALWORTH

Steeliron

LUBRICATED PLUG VALVES

No. 1796 — SCREWED
No. 1797F — FLANGED

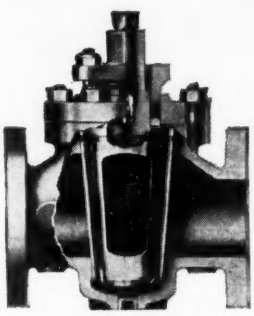
No. 1796

for working pressures up to 175 lbs. O.W.G.

This Walworth lubricated plug valve meets a wide range of requirements, and also helps to conserve critical copper. Made of close-grained, high strength cast iron, it uses insoluble lubricants to assure tight-sealing, easy operation, and resistance to corrosion and wear. This valve is made in sizes from 1″ to 4″, with screwed or flanged ends.

Other Walworth Lubricated Plug Valves are made in sizes from 1/2″ to 24″, for pressures from 125 to 5,000 psi., and for vacuum requirements. They are particularly adaptable for control of gritty solutions and many other erosive and corrosive industrial and chemical solutions. For complete information on Walworth Lubricated Plug Valves, write for a free copy of Walworth Circular No. 91.

Walworth also manufactures a complete line of gate, globe and check valves, as well as pipe fittings and pipe wrenches. Walworth Catalog 42 gives detailed information. Write on your company letterhead for a free copy.



Just a turn of the lubricant screw on a Walworth Lubricated Plug Valve forces insoluble lubricant under pressure through a grooving system and down beneath the plug. The lubricant seals the valve against leakage in either open or closed position, reduces friction between plug and body, and helps protect plug and body against contact with corrosive line fluids.

These are some of the features which make Walworth Lubricated Plug Valves ideal for many "difficult" services.

ARMY E NAVY

BOSTON WORKS
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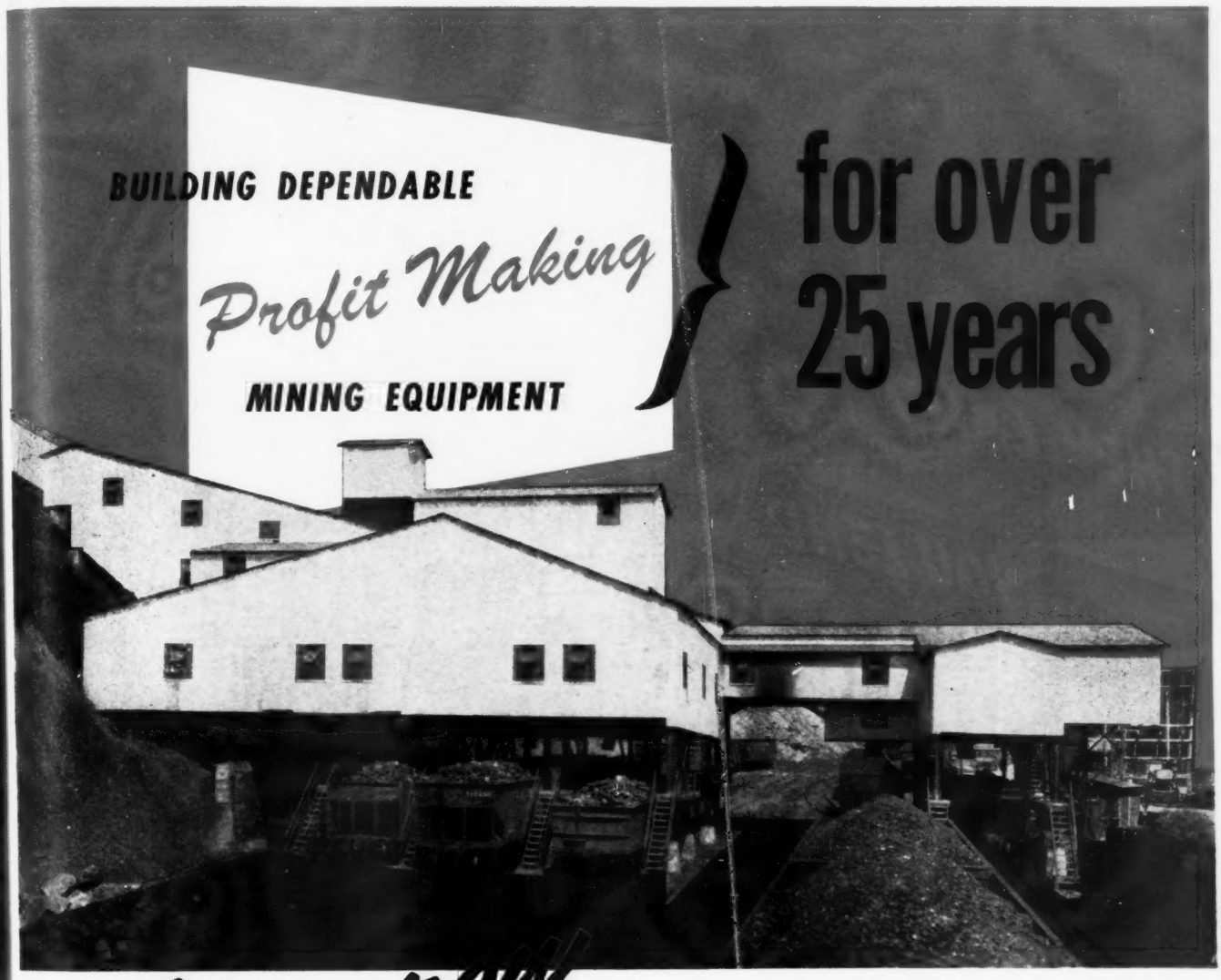
WALWORTH
valves AND fittings
60 EAST 42nd ST., NEW YORK 17, N.Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD



Morrow COAL TIPPLES

COAL HANDLING EQUIPMENT

Complete

COAL TIPPLES and COAL HANDLING

Equipment

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Modernization of your operations NOW . . . will enable you to successfully meet the keen, cost-conscious postwar coal markets. Morrow engineers have the advanced "KNOW-HOW" for designing and building dependable equipment that will help you to reduce labor, maintenance and production costs . . . thus enabling you to keep your operations PROFITABLE.

Morrow engineers are available for consultation anywhere, anytime, without obligation.

MORROW

MANUFACTURING COMPANY

Wellston, Ohio

DESIGNERS AND BUILDERS OF COAL HANDLING EQUIPMENT FOR OVER 25 YEARS

Our troops go ashore from a landing barge to engage the enemy.
ACME PHOTO

Wire Rope goes wherever our land, sea and air forces go. To carry the fight to the enemy, their supply of rope must constantly be renewed and expanded. You tell them, "Here . . . use some of mine," every time you get along with fewer new ropes. The suggestions below, *if followed,* will help you conserve wire rope . . . and time . . . and manpower . . . by making each rope installation deliver maximum service:

1. Use preformed rope wherever possible. It handles more easily . . . requires a shorter breaking-in period . . . resists kinking and bending fatigue . . . protects men and equipment from broken outer wires.

2. Instruct operators in correct practices. Wire rope life is in their hands. By avoiding overloads, jerking, too fast acceleration and excessive speeds . . . by watching drums and sheaves for conditions that cause rubbing, nicking or pinching . . . the operator may double the service of a rope.

3. Lubricate wire rope faithfully. Think of those endless grooves between wires and strands as oil holes through which the moving wires and hidden core must get sufficient lubrication to minimize friction and wear. Rust and corrosion attack rope parts whether working or waiting, unless you provide a protective coating.

And team up ropes that give uniform service. *Preformed* Yellow Strand Wire Ropes work smoothly together because they are engineered to the same standards of efficiency and durability. Used on hoists, inclines, mining machines, car dumpers, tramways, draglines, shovels, they take a lot of the headache out of wartime mine operations. Our Hand Book, "Wire Rope for Mining," contains many practical pointers. Send for a copy . . . today.

Broderick & Bascom Rope Co., St. Louis

Branches: New York, Chicago, Houston, Portland, Seattle
Factories: St. Louis, Seattle, Peoria

YELLOW STRAND
PREFORMED WIRE ROPE

2300 RPM LATER

For many years, the excessive weight and bulk of cumbersome, slow speed models barred the door to low cost diesel power for many industries and countless types of equipment. But now—2300 RPM later—that barrier has been removed by the high speed diesel. In this trend toward higher horsepower output through higher engine speeds, the Cummins Dependable Diesel has consistently been the trail blazer—the leader. Every day sees this trend continuing . . . just as every day sees Cummins Diesel Power doing the toughest heavy-duty jobs at a lower cost . . . with greater profit.
CUMMINS ENGINE COMPANY, INC., Columbus, Ind.

CUMMINS *Dependable* DIESELS

SINCE 1918...PIONEER OF PROFITABLE POWER THROUGH HIGH SPEED DIESELS

HEAVY-DUTY MODELS FOR STRIPPING, HAULING, AND GENERATING SERVICE

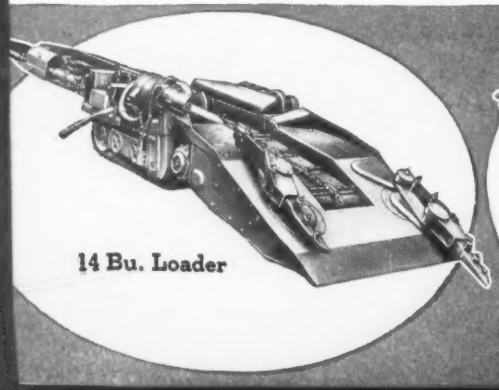
COAL ★ BAUXITE ★ POTASH

OR ANY OTHER MATERIAL IT MAKES NO DIFFERENCE TO JOY EQUIPMENT

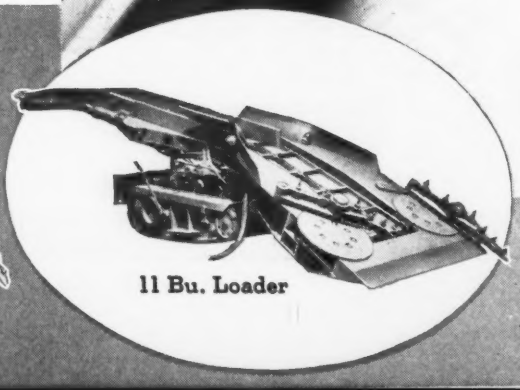
The men who work the tough jobs know what a big help it is to have rugged, dependable equipment that gives the maximum service between overhauls. That's one reason many of them work with JOY . . . whether they are mining high or low seam coal, aluminum-bearing clay, dusty white potash or other materials.

For, no matter where they're operating underground, Joy Shuttle Cars and Loaders have proved their worth time and time again in speeding up output and reducing operating costs.

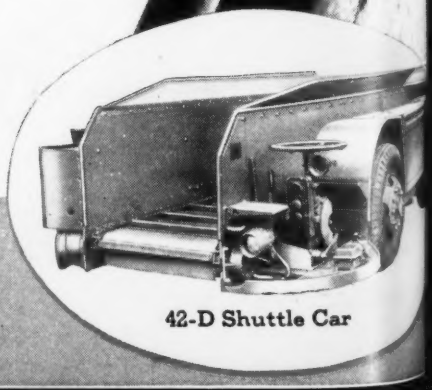
A survey by a JOY Engineer costs you nothing . . . yet may be the very answer to your problem. May we be of service?



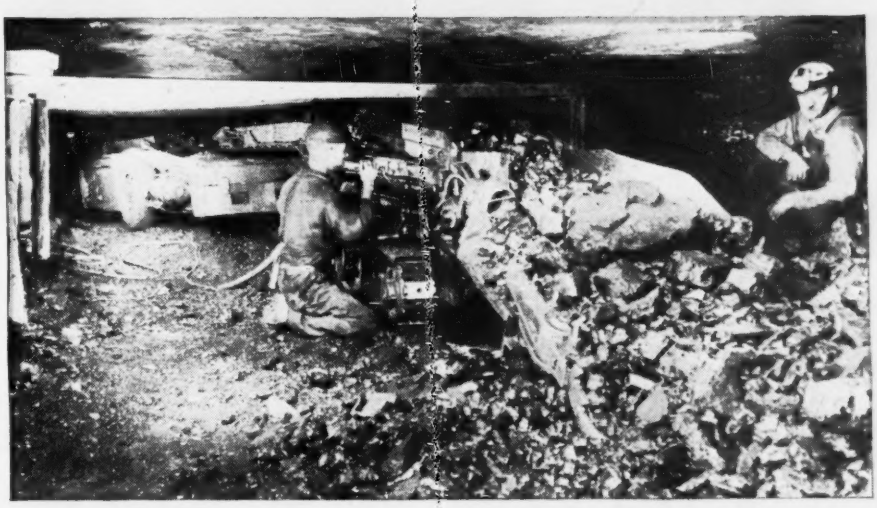
14 Bu. Loader



11 Bu. Loader



42-D Shuttle Car



Working under difficulties... a 32" Shuttle Car and Loader.

The 11 Bu. Loader is invaluable for loading in hard rock mines.

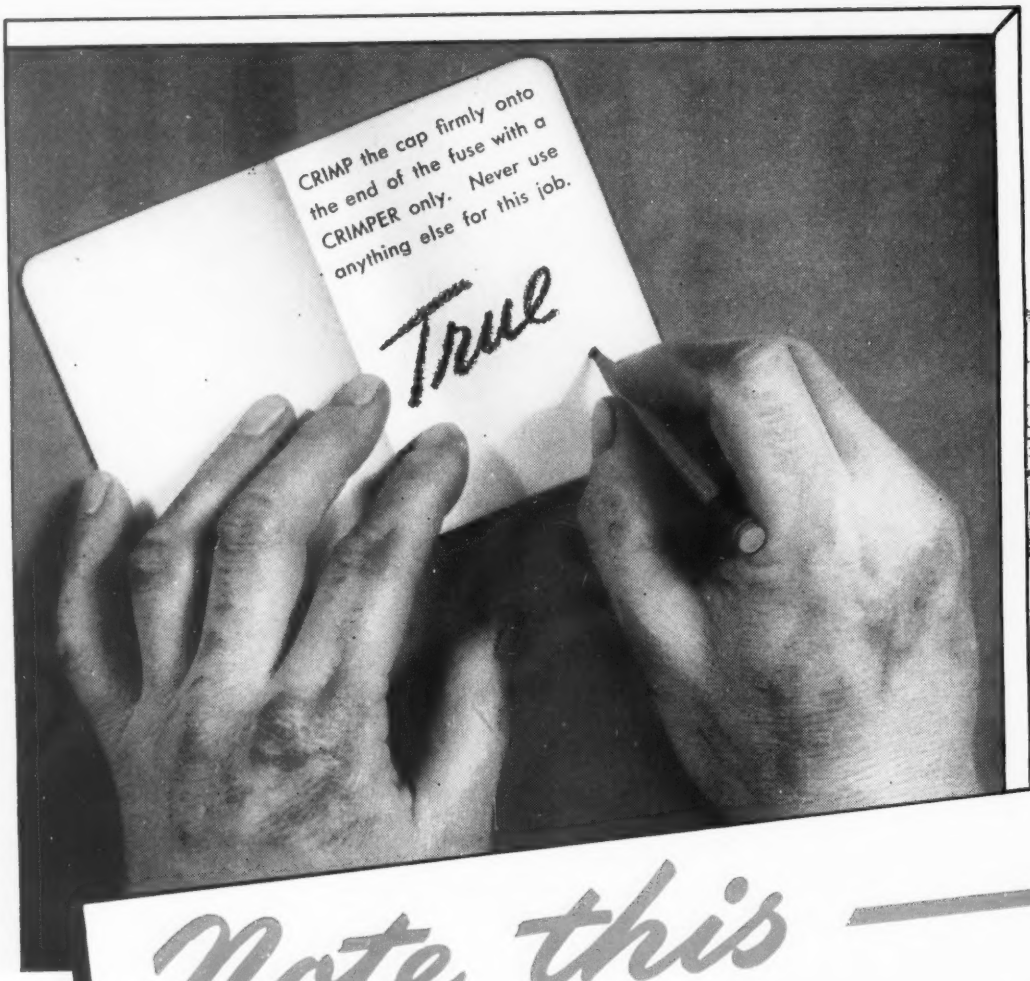
This JOY 42" Shuttle Car loading onto a conveyor belt graphically tells a story of fast, quantity production.

32-D Shuttle Car

JOY

MANUFACTURING COMPANY
FRANKLIN, PA.

Consult a Joy Engineer



Note this —

IT'S SOMETHING TO REMEMBER — EVERY DAY

There are two popular types of crimpers: the *ring type*, which makes one or two tight grooves all around the copper shell of the cap, and produces a tight, waterproof joint; and the broad jaw or *flat type*, which squeezes the copper shell tightly about the fuse, folding the excess metal outward in two tight folds or fins. The broad jaw crimp should be waterproofed when used in wet places.

Crimping is one of your most important steps in preparing the primer. A loose crimp may permit the cap and fuse to come apart, resulting in a misfire or possibly a delayed shot.

Send for the Safety Fuse book, which explains all this in full detail.

12

ENSIGN-BICKFORD

Safety Fuse

Safety Fuse since 1836 . . . also Primacord-Bickford Detonating Fuse.

THE ENSIGN-BICKFORD COMPANY • SIMSBURY, CONNECTICUT

Coal Age

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

Ivan A. Given, *Editor*

June, 1944

Coal for Victory

PRODUCTIVE efficiency, coal well knows, is the key to progress with fair profits to stockholders and good wages to mine workers. In this critical third year of the war, productive efficiency could be, also, the key to providing a large part or all of the additional coal needed for war and essential civilian activities. For instance, an increase of 0.1 ton per man-shift, while seemingly slight, nevertheless could mean a rise of 13,000,000 tons in 1944 on the basis of expected working force and days of operation. If output per man-shift could be raised 0.3 ton, the resultant increase would be approximately 39,000,000 tons—almost the goal set for 1944.

A rise in productive efficiency, therefore, is an objective to be striven for not only for its future benefits but because it will go far toward meeting the immediate problem of getting out war tonnage. When coupled with other measures for increasing output, such as conversion to mechanical loading, supplementing deep operation with stripping, reducing absenteeism, eliminating production stoppages and promoting safety, it makes meeting or beating the 1944 schedules distinctly more of a possibility.

Coal has earned high praise for its production accomplishments (witness Donald M. Nelson and Dr. C. J. Potter at the American Mining Congress War Conference) and it has the opportunity of going on to even greater heights in service to the war effort and the American people. *Coal Age* firmly believes the industry has the ability to do the job and in that belief offers with the support and cooperation of the Solid Fuels Administration for War, the "Victory Coal Production" awards announced elsewhere in this issue. May the winners be numerous and thus reflect coal's determination to support the war effort to the utmost.

Not Surprising

WHERE TO NOW? was at least one reaction to the decision of the War Labor Board in the case of the bituminous coal contract—a decision that found the Board swallowing more or less gracefully a difference of some twelve minutes between "assumed" and actual travel time. Considerable space could be devoted to the objectionable features of the contract, such as the portal-to-portal payment system, forced on the majority of the industry in advance of a determination of possible liability. Even the union officials probably could point out some undesirable features in the agreement, despite the fact that they successfully bucked the government and got much of what they went after.

When the conditions under which the contract was evolved are scanned, however, the results are not so surprising. Neither the bituminous contract nor the previous anthracite agreement was negotiated on a businesslike basis leading to a meeting of minds on practical grounds. Rather, they were the products of political expediency, arbitrary action and bickering and jealousy in government. To repeat, the results are not surprising—and serve once more to demonstrate that government interference in industry affairs all too often leads to action having little relation to realities.

Still Tough

PETROLEUM'S supply prospects have so far had little effect on the competition it offers to coal. Oil companies may have to hunt up another source of their products relatively soon or, as some hold, they may not, but in any event, they show no signs of curtailing their activities in fuel oil. In fact, if higher gasoline mileages now being forecast should result in a decrease in consumption, the pressure for fuel-oil sales should rise.

Everything adds up to no relaxation in fuel-oil competition in the near future. Whether the increased pressure will reduce the market for coal depends upon coal itself. Consider the railroads. Oil has been gaining there for some time. Now, the gas turbine appears to be on its way to active use in locomotives. So far, however, these gas turbines have been designed around oil as a fuel.

The answer to this and other competitive problems is research and development of more efficient and convenient coal-fired equipment, plus research and development of methods of gasifying and liquefying coal that will provide even greater flexibility in use. That research is now under way, but the more support it has the faster it will go and the greater will be the results.

PUBLIC

One Year's Work in Bu

Coal is learning to use a new tool—public relations—in competing for tomorrow's markets. Real progress has been made in building public confidence and good will. The big job, however, is still ahead. Increased industry support will speed results.

JUST A YEAR ago the coal industry in the United States was hitting perhaps a new emotional low. John L. Lewis had called the second general wartime work stoppage. The government, proprietor of the mines since May, was threatening dire measures, among them moving in troops to mine the coal. An angry Congress was about to pass the boomeranging War Labor Disputes Act. The nation's press was in a righteous dither because war industry was in danger of grinding to a stop for lack of coal.

Amid these tumultuous and forbidding circumstances, the bituminous coal industry's *first* comprehensive public relations program was launched. A less propitious time scarcely could have been picked by design. Yet the very difficulties that attended the program's inception forcefully demonstrated the need for it.

In the year since last June the bituminous industry has spent considerable money in keeping its public-relations program going. Anthracite, its public-relations program several years old, found that it, too, was facing new, imponderable wartime problems, and while it had the advantage of experience, in some respects new lessons had to be learned.

THE BITUMINOUS COAL INSTITUTE was established to disseminate to the public information about the bituminous coal mining industry in the United States. The need of such an agency was recognized by a group of operators who pledged their support to the movement and organized the institute in the summer of 1943. Since that time, this group has been joined by other operators, so that the original tonnage supporting the institute has been nearly doubled, and still other operators are joining from time to time. A board of directors chosen from the contributors directs the organization, and a policy committee selected from this board is in intimate and frequent contact with Harry Vawter, who, with his staff, directs the organization in his New York office.

A fundamental concept of the institute is that facts and not propaganda shall be publicized. The directors believe that the truth frankly told will create a friendly public opinion.

Active advertising commenced in December, 1943, and already much favorable public recognition has resulted. Plans are now being made for enlarged activities in the current year. Quick results are not to be expected, but the board of directors believes that substantial and persistent effort will create an informed and friendly public opinion.

FRED S. McCONNELL, president
National Coal Association; Bituminous Coal Institute

B.C.I. Mine Distribution

State	*Number of Mines*
Alabama	5
Illinois	21
Indiana	10
Kansas	3
Kentucky	28
Maryland	5
Missouri	3
N. Dakota	4
Ohio	11
Oklahoma	3
Pennsylvania	47
Tennessee	3
Virginia	13
Washington	1
West Virginia	126
Total	281

Number Operated per Company

Companies with one mine	33
two mines	16
three mines	4
four mines	5
five or more	20
Total	78

Total estimated tonnage represented: 144,000,000 tons

RELATIONS:

Building Good Will for Coal

What have the public-relations organizations of the two branches of the industry accomplished in that twelve months? Have the major problems of a year ago been met and solved? What are today's major public-relations problems and what is the industry doing about them? What still remains to be done for the future? How has this new approach to public relations affected the industry, its operators, its supervisors and its employees? And, finally, is coal's public relations accomplishing its purpose of creating better understanding and good will toward the industry?

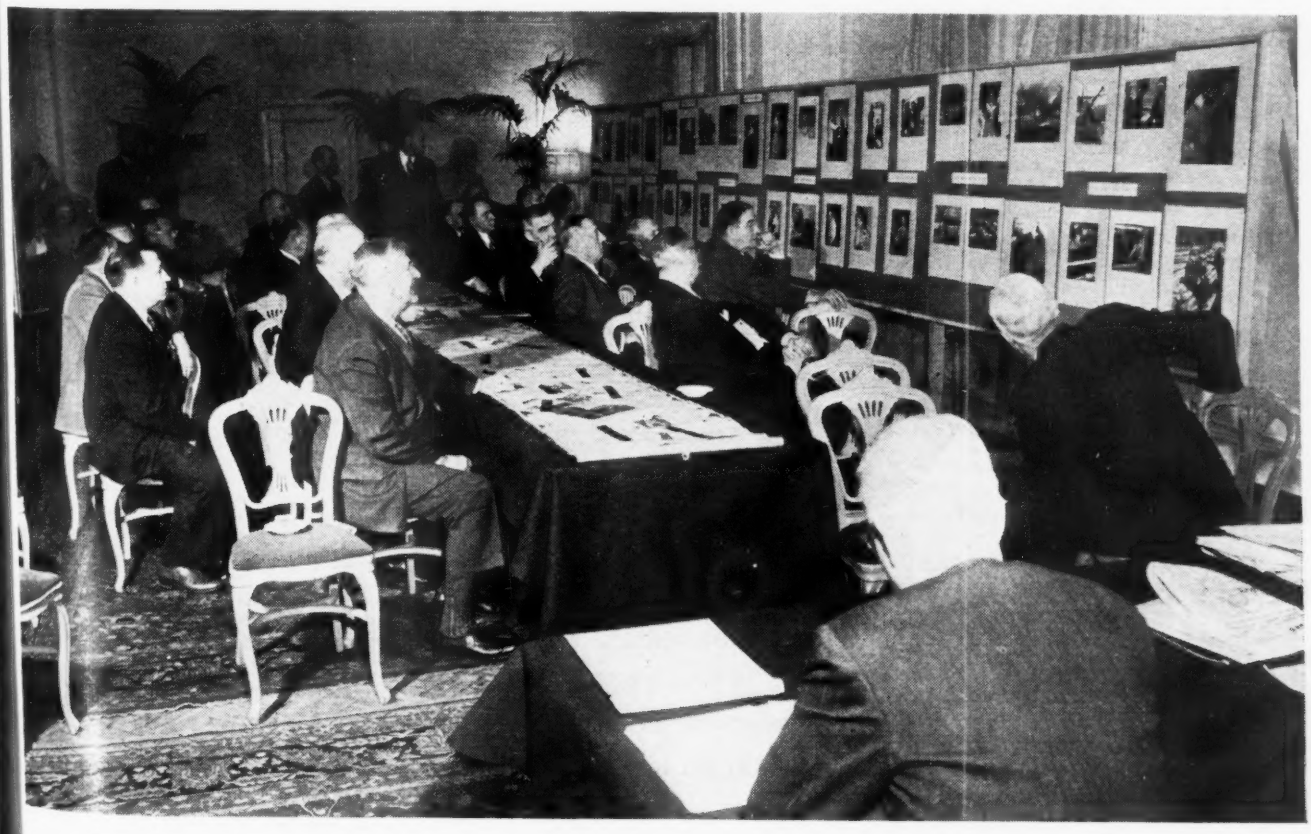
A survey of progress over the past year makes an emphatic "yes" the answer to the last question. To the other the record of the past twelve months by both Bituminous Coal Institute and Anthracite Industries, Inc., and their plans for the future must supply the answers.

What *Coal Age* said about public relations a year ago is just as applicable now as it was then: "Dollars and cents to every man in coal mining" because the public does not like to do business with an industry it considers "sick," backward, abusive or grasping. "The job is big but the rewards for understanding and cooperation for the advancement of the interests of the industry, its employees and of the public are even bigger," as *Coal Age* said last July.

Have any of those rewards been reaped? Actually, in the case of bituminous certainly and of anthracite possibly it is too early for exact measurement. But there are good indications that real benefits are being obtained and that these benefits will grow as the program advances.

Setting aside for the moment purely wartime questions, coal last year faced three major public relations problems. They were, briefly, erroneous ideas about miners' earnings and living conditions, erroneous ideas about miners' working conditions and a reluctance on the part of the public to accept coal as a modern fuel or its producers as a modern industry. In addition, both bituminous and anthracite faced the repercussions resulting from government seizure and work stoppages, and anthracite had to take on the added burden of a shortage. The shortage, incidentally, was the result of oil conversions and increased military and civilian demands rather than any failure of the industry to produce.

Winning and holding public regard, as has often been said, cannot be accomplished by cabalistic incantations. It is the result of hard work. Dozens of industries have



REPORT TO THE INDUSTRY: B.C.I's directors inspect pictures used to help tell coal's story.

been at public relations for years. In that time they have learned the benefits are real and worth while, but they also have learned that they must keep at it. Results cannot be expected overnight—at least long-range results.

If a year's work on public relations for bituminous coal accomplished nothing more, it did mark this signal and meritorious forward step:

Coal began to tell its story.

Bituminous Coal Institute, under the direction of Harry M. Vawter, started its work of public relations for the industry last summer with three major objectives:

"1. That the bituminous coal industry is well managed, alert to its responsibilities to employees, the public, to the government.

"2. That bituminous coal is—and will continue to be—the best and cheapest source of energy and heat the world has ever known.

"3. That the steady production of bituminous coal is too important, in war and peace, for the industry to be made a political labor football."

B.C.I. started out with a membership of 42 companies, representing about 120,000,000 tons annually and a budget of approximately $600,000 for the first nine months of operation. It now has a membership of 78, including a gratifying number of the highly important small producers, representing about 144,000,000 tons. The chairman of the institute, also the president of the National Coal Association, is at present Fred S. McConnell, president, Enos Coal Mining Co., Cleveland, Ohio. The chairman of the policy committee is J. P. Williams Jr., president, Koppers Co., Pittsburgh, Pa.

Public Beliefs

Last September *Coal Age* sampled public opinion. The results ("Public Relations: Coal's No. 2 Job," September, 1943, pp. 46-56) showed among other things that 73 percent of those responding considered that coal miners worked under worse conditions than other workers, that 72 percent thought

WHERE COAL'S STORY HAS APPEARED

THE NEW YORKER • NATIONAL GEOGRAPHIC • THE AMERICAN MAGAZINE • TIME • NEWSWEEK • TOWN AND COUNTRY • EVERYWOMAN'S • FORBES • ASSOCIATED PRESS • UNITED PRESS • INTERNATIONAL NEWS SERVICE • NEWSPAPER ENTERPRISES ASSOCIATION • UNITED FEATURES • 200 RADIO STATIONS • BIRMINGHAM *News* • LOUISVILLE

their living conditions were worse, and that 49 percent thought their wages were worse. The institute considered one of its first jobs was to reduce those percentages. An idea of what the institute is trying to do may be gathered from the classifications into which it has divided a pictorial display of 300 photographs for consumption outside the industry. They are:

"Miners' children are healthy and happy."

"Coal miners at worship."

"Safety made the daily watchword."

"Coal miners enjoy many advantages."

"Coal towns have good schools."

"Company-store prices are right."

"Most miners are well housed."

"Miners receive good medical care."

"Finest hospital facilities."

"Modernized coal mining."

"Well," it might be said, "that's very pretty, but we know all that." Which is just the point. The industry knows it, but does the public? Obviously not, or the public would not have felt that miners' living and working conditions were far below the average. The classic example of public reaction was contained in Mr. Vawter's recital at the National Coal Association convention in Cleveland last winter of his negotiations with a national magazine for a story on coal miners' children. When he presented a set of pictures showing chubby, healthy, well scrubbed youngsters playing in the backyards of neat homes and studying in well-lighted classrooms of modern schools, the lady editor of the magazine turned the story down, because "miners' children are dirty and don't wear shoes."

What, it might be asked, has that got to do with how many tons of coal there are in a fall? Or with seeing that auxiliary activities are conducted so that loading machines can operate at the highest possible rate? Just this: Tons per fall can be doubled or loaders can produce a thousand tons per shift, but if it can't be sold nothing has been gained. Time and time again it has been demonstrated on the balance sheets that when the public believes an industry is decadent, unfair, back-

Carrying Coal's Story to the Public
Socialite
MINERS ARE A TOUGH BREED OF MEN. THEY WILL NOT BE PUSHED AROUND. THEY KNOW THEIR ENEMIES AND THEIR FRIENDS

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Courier-Journal • SAN FRANCISCO Call Bulletin • CHICAGO Sun • INDIANAPOLIS Times • BOSTON Globe • DETROIT News • OMAHA World-Herald • NEW YORK World-Telegram • NEW YORK Times • NEW YORK Herald-Tribune • NEW YORK Daily Mirror • CINCINNATI Post • PHILADELPHIA Evening Bulletin • PHILADELPHIA Inquirer • PITTSBURGH Press • NEWARK Evening News • HARTFORD Courant • WASHINGTON News • WASHINGTON Post • PIC • LOOK • and numerous others.

TELLING THE PUBLIC: Part of Anthracite Industries' campaign last year was conservation, a job which is being continued into the coming heating season. Many newspapers and magazines printed articles, like the one shown here, on saving of fuel through home repair and cleaning of heating equipment.

EVERYBODY'S WEEKLY JULY 4, 1943 SECTION OF The Philadelphia Inquirer

Stop That Thief

Experts Show How You Lose 10 Percent of Coal, Urging Preventive Measures Now

By Stewart Asher

YOU may not know it but you needlessly are throwing away coal—not to mention precious dollars. In a survey conducted at Primos, Pa., by Anthracite Industries, Inc., research and consumer education organization of the hard coal industry, it was found that at least ten per cent of the nation's home-heating coal (both anthracite and bituminous) is being wasted due to neglected and faulty heating equipment.

More than a quarter of the country's four and a half million anthracite-heated dwelling units are located in Pennsylvania east of the Susquehanna river. Nearly a tenth of that four and a half million are in Philadelphia, where eighty per cent of all dwelling units are anthracite-heated. This means that a large share of the nation's coal saving can be accomplished by Philadelphia consumers alone—and that, with profit to themselves.

NEARLY 400,000 tons of anthracite can be saved here annually and diverted to the war effort. Patriotically, that's quite a sizeable coal pile. It would fire a lot of vital war production furnaces. In the Philadelphia territory experts estimate that the average private house burns eight tons of anthracite each year. Hence the average family can save nearly a ton of anthracite annually — some families much more. They can save at least that amount by eliminating the causes contributory to that ten per cent waste—faulty heating equipment. In many cases the situation can be remedied by a member of the family, even by the housewife herself, if she happens to be in the position of "duration" head of the house.

After the last fire of the season, it is a common practice among family furnace-tenders to dump the grates, shovel out the ashes, and call it a day. Often they wait until it is time to light the first fire of the autumn before attending to this simple chore.

Furnace or asbestos cement quickly seals air leaks. Apply with putty knife or flat stick.

Attachment fitted to vacuum cleaner provides the easiest way to remove fly ash or dust. (Right) Take down the smoke pipe, dump out ashes and rust—it's an important operation.

minor repairs to your heater, you can't do that anymore—with any degree of assurance that he'll be able to handle the job. For dealers are busier than ever now because of the rush to convert to coal after the Petroleum Administration's warning of oil shortages in the East this fall. The manpower shortage also has greatly reduced their staffs.

THE greatest coal waster is fly ash or dust which collects during the heating season in all furnaces and boilers—even the best and smallest ones. The condition is far from extraordinary. It is a natural sequel to the burning of coal. But fly ash deposit acts as insulation and prevents one hundred per cent heat absorption. In other words, there's no use trying to combat the condition. It will only cost you more dividends of coal to produce less heat. The thing to do is eliminate the condition before the start of the fall heating season. If you've not been in the habit of having your heater cleaned annually by doing so you'll discover that, when clean, it not only burns less coal but gives out more heat.

Experts reveal some startling figures on this subject. For instance, 1-32 of an inch of fly ash on the inside surfaces of a heater will cause 8% per cent coal wastage. A

ment or two might easily have a coating of the latter thickness. The cleaning job is simple and should be the first one you tackle. All you do is open the clean-out door or doors and clean all the inside surfaces thoroughly. A metal scraper and a long-handled wire flue brush will do the trick. If you have a cylinder type heater, cleaner the job is even easier.

Next you take down the smoke pipe and dump that. Don't be amazed at the amount of fly ash and rust that comes out. There will be plenty of both, all of which goes to prove to you that this ought to be a yearly chore at least. If the pipe seems to be badly corroded or perforated it is best to replace it immediately. To wind up the cleaning job shake the grates and take out the ashes. But don't throw them away. Your Victory garden can use them. For the ashes help drain and aerate garden soil. Sprinkle them over the ground and rake into the earth.

SECOND greatest coal waster is air leakage. Air leaks may be found around chimney and heater doors, around smoke-pipe joints, around casting joints or around the base of the heater. The leaks show up as low level short-circuit the draft and chill the heating surfaces. These below fire level

or ash-pit doors are warped and do not fit you'll know that air is leaking into the furnace and you're wasting plenty of coal. The door should be made to fit tightly or be replaced. However, if clean-out or ash-pit doors are found to be warped these can be fixed with furnace cement, which can be obtained at most paint stores. Just mix to a thick paste and apply with putty knife or flat stick. Air leakage is almost certain to occur around the smoke-pipe where it fits into the chimney. When you replace it after cleaning you should guard against this by sealing it with asbestos cement, obtainable in any hardware store. Looking also for leaks is easy. First, shut all doors or dampers. Then pass the flame of a candle over all the surfaces where leaks might be found. If the flame is drawn into the heater at any point you'll know you've located down a leak.

OTHER heater ailments you might discover are likely to need expert attention or consultation, in which case your dealer should be called into the picture. If your chimney top is lower than surrounding trees or construction obstructs it will cause poor draft and resultant additional coal waste. A means to the end to correct that difficulty

Reprinted by special permission from Everybody's Weekly magazine of the Sunday Philadelphia Inquirer.

ward or avaricious, it shuns its product, buys it reluctantly, or buys it only because it has no choice. And it has a choice where fuel is concerned. The chain stores learned that lesson, the utilities learned it, the railroads learned it and the brewers and others learned it—most of them the hard way.

Facts Not Told

For years a wall of resistance has been built up against the coal operator. The lady editor was part of that wall. Newspaper and magazine editors, commentators, writers, all have been part of it; not necessarily willingly or arbitrarily but because for years they had been fed on the propaganda of the downtrodden coal miner. Unfortunately, during some of that time at least some of what was told the public was true, but by no means all. Worse, as conditions improved nothing was done to publicize that fact. Because not one person in ten ever sees a coal miner, let alone a coal mine, it was easy for them to believe that miners' children were dirty and went barefoot. No one denied it. Worse, no one seemed to care whether it was denied or not. Those two chores became B.C.I.'s first job.

For years the coal industry had been known to the public, its customer, only through its disasters, its strikes and other rare manifestations of temporary troubles. Typical was the example of a newsreel cameraman whom B.C.I. took into eastern Ohio. In one sense he was novelty. He admitted he had been in a coal mine. In fact, he said he had been in and around several. But the only mine assignments he had ever had were disasters. Meanwhile, coal was spending millions of dollars on new equipment to make coal mining more efficient and easier, thousands more on research to make its product better and to find better burning equipment so the public would get more for its coal dollar; large sums on safety to remove or lessen industrial hazards, and additional thousands on medical care and hospital facilities for its employees, and schools and recreational facilities for its employees' families. Coal was contributing heavily to advances in medicine and chemicals and, since the war, it has been performing a veritable miracle of production in supplying the one commodity without which the nation's war machine would stop. The industry was doing all this, and within the industry these facts were well known. But outside the industry virtually no one knew them. That, too, became part of B.C.I.'s work.

How well has the job been done? To start with, it has been complicated by government operation of the mines and by the increasing unavailability of all the coal some sections of the nation can use. Statistically, B.C.I. has taken space in nationally circulated magazines with seven full-page advertisements telling the industry's story. Those ads reached an estimated reading audience of 350,000,000 people. More than 300 photographs have been taken of various aspects of the coal industry, and published in newspapers and magazines from coast to coast. Some phases of the industry have been the subject of national radio hook-ups. Coal's story has been told on 200 stations in the past year.

Inquiries Numerous

Articles on the constructive side of coal have appeared in *National Geographic Magazine*, the *American Magazine*, *Pic* and others and have been widely dispersed by national press services. The institute estimates that its press-clipping record for nine months—clippings the source of which it can trace—would cover 2,000 sq.ft. of floor space. In that time the institute has submitted 171 different stories, ideas, articles, pictures and newsworthy items to newspapers and periodicals and has received 59 requests for data from editors. The institute estimates that its messages reached a combined audience of more than 1,200,000,000 potential readers.

These statistics, however, are overshadowed by this all-important achievement: all this publicity has been constructive publicity—publicity based on the facts and consequently publicity which promotes public respect and good will.

Thus it is easy to see that the story of coal is being told. Is it being read? Is it being believed? It is difficult to tell definitely at the moment. In fact, it would be unfair at this stage to attempt hard-and-fast measurement of results since the program is, relatively speaking, only in its infancy. One year does not make a public-relations program any more than one swallow

makes a spring. But progress is being made and the institute offers this estimate of what has been accomplished:

"We have only made a start, but that start has been favorable and we can expect increasing acceptance from the public of the facts which we tell them. What is required now is to continue to present our message to the public as widely and as effectively as we can. We can go ahead with the firm assurance that these messages will acquire a growing and increasingly believing audience which in the course of time will replace its present misinformation with true facts about the bituminous coal industry."

The anthracite industry's problem was easier to define and in that respect, at least, easier to treat. In the words of the industry, "people are sore at anthracite." In recent months the problem has largely been one of consumer relations.

Appeal to Consumer

Early in the spring of 1943 the anthracite industry foresaw that there would be disruptions in civilian supply during the 1943-44 heating season. Consequently it embarked on a consumer educational plan stressing the need for conservation and how to do it. During the summer it featured methods of putting heating equipment into shape for the burning season. Consumer literature was distributed, publicity released in newspapers both through news services and special feature writers, as well as exclusive stories in general and trade magazines.

With the approach of the burning season this theme was switched to stressing savings to be effected through proper firing practice and draft control. Advertisements were run in 84 newspapers throughout the consuming area, and the same information was expanded and put in booklet form, of which 2,000,000 copies were distributed to users.

As the heating season progressed and shortages developed in some areas during January, February and March, another program of advertising was instituted to explain the industry's position to consumers and the efforts that were being made by producing companies and dealers in cooperation with the government to see that available supplies were fairly distributed.

Concurrently with this shortage program a separate appeal was made in the anthracite mining area. In early January a 17-week program of radio and newspaper advertising was started to increase production. Five times each week the radio program offered 15 minutes of music and a guest speaker, all talent being drawn from the region itself. A parallel program of promotion for the program was aggressively pushed and the broadcast was made from theater stages in 20 towns.

While publicity and paid advertising space during the past season were the most visual efforts of Anthracite Industries, much was accomplished at the same time by the efforts of Anthracite Industries Laboratory, field representatives and special consultants. Personalized service was given to the Solid Fuels Administration in investigating and surveying conditions existing in markets throughout the consuming area. Dealers were trained in furthering conservation and many State and municipal employees were taught better furnace and boiler operating methods. Laboratory technicians helped the government and equipment manufacturers in solving problems created by the war in equipment and housing.

Anthracite Industries has embarked on a program for the coming season of educating both consumers and dealers in the proper use of Regulations 17 and 18, which outline the distribution plan for 1944-45.

Those, broadly speaking, are the accomplishments in public relations for the past twelve months for both branches of the industry. Both face new and perhaps increasing problems. Both, fortunately, have plans to meet them.

What's the Answer?

Why should all this planning be necessary, this expenditure of considerable sums of money, this engaging of experts to analyze and solve a problem which might, at first glance, appear to have little bearing on increasing tonnage, efficiency and profits? The answer may be summed up in two words: consumer resistance. Without a market, the most modern methods of production are wasted. Without a market, ability to produce more and cheaper tonnage becomes an empty victory.

The fact that ability to produce means nothing without markets is reflected in the public-relations budgets of a number of other major industries. In the case of 14 dealing with products from oranges to life insurance individual annual budgets range from $1,000,000 to $4,500,000, aggregating for the 14 $26,600,000.

Assuring good public relations is the responsibility of the producers in an industry and cannot be left to the operations of chance. Benefits in increased business cannot be expected the next day. The American Telephone & Telegraph Co. worked day and night at its public relations for 30 years before it paid off in concrete results—the utter and abysmal collapse of a government investigation into its affairs. But, as events already have indicated in coal, the results began to show in a reasonable time and in the long run will lead to substantially higher tonnage. These results flow from several highly desirable accomplishments. Among them are:

Benefits for Coal

An improvement in industry morale. It helps any man or any industry to be told and to read that he's doing a good job instead of continually hearing only how backward and incompetent he is.

A shift from the defensive to the offensive. No industry can do its best when it is spending half its time defending itself.

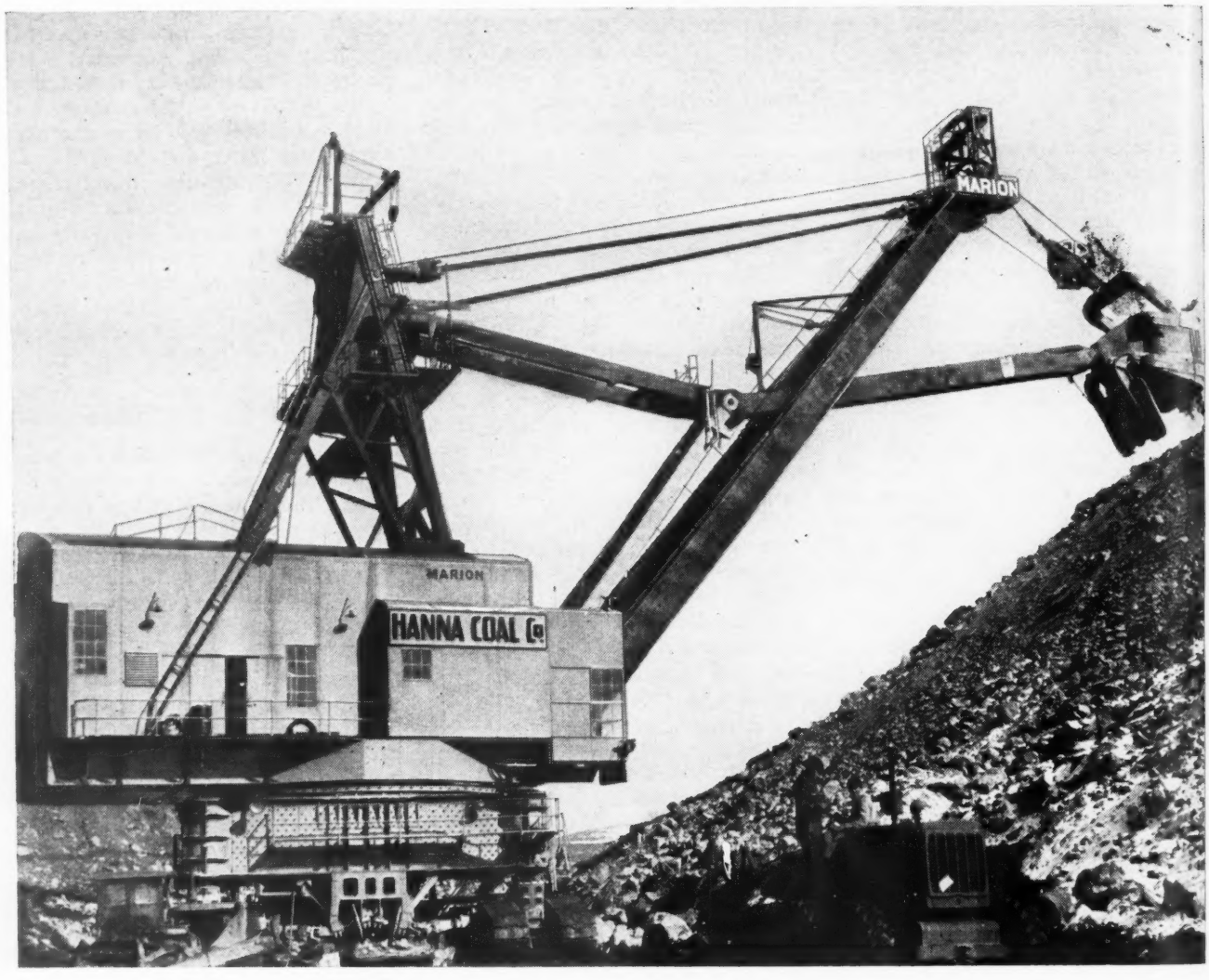
The opening of new markets. Unless coal can convince the public that it is furnishing modern, convenient heat, it will be at a distinct disadvantage in the scramble for postwar markets. The time to tell the public about the advantages of coal is now, before the anticipated postwar boom begins.

Better performance and better employee relations. No public-relations program can succeed which is not based on the truth. If coal wants the public to believe it is a modern, efficient and responsible industry, then it must be one. The improvements necessary to bring that about will inevitably lead to better performance and better employee relations.

A backlog of good will. This perhaps is the prime objective. Statements from the industry find more ready acceptance than statements from individuals. Told often enough and graphically enough, they gradually will gain public acceptance, provided they are supported by the facts. If trouble should come, the public will have acquired the habit of believing what the industry says about itself. It never will if it hears from the industry only in time of trouble.

The whole need for a sound public-relations program can be expressed in this estimate of its worth by a prominent public-relations counsellor:

"The public today buys not only products; it accepts or rejects products on the basis of an organization's social, political, economic and moral thinking and action, on everything that has gone into the making or the sale of the product."



Georgetown's new 35-cu.yd. knee-action stripper in action.

NEW 35-CU.YD. SHOVEL

Boosts Tonnage at Georgetown Stripping

Output of 2,300,000 Tons Expected in 1944 From Equipment at Hanna's Georgetown Pit — Stripping Results in 90-Percent Coal Recovery and Thus Promotes Conservation—Some Spoil Rehandled

WITH a new 35-cu.yd. shovel scheduled to do better than one-third of the work, the Hanna Coal Co., St. Clairsville, Ohio, has set 2,300,000 tons, an increase of almost a million tons, as the goal for its Georgetown No. 12 strip mine in 1944.

Georgetown was opened in January, 1940, with an 8-cu.yd. shovel. In September, 1941, a 17-cu.yd. shovel was added, while the new 35-yd. unit went into service in March, 1944. It is equipped with a 105-ft. boom and heated dual-control cabs. It weighs 1,600 tons and is expected to handle over 1,000,000 cu.yd. of material per year.

One of the interesting features of the Georgetown No. 12 stripping is that approximately 73 percent of the output is coal that could not be mined by any other method. In this area, the coal lying under less than 50 ft. of overburden is not minable by underground methods because of the defective roof encountered. Between the 50- and 80-ft. cover lines, 90 percent

of the coal is recovered by stripping. This is 30 percent more than could be recovered by underground methods. Thus a substantial contribution is made to the conservation of eastern Ohio's coal resources by this strip mining.

With the new unit, the Georgetown stripping equipment lines up as follows:

300-E Marion shovel, 8 cu.yd.
550-B Bucyrus-Erie shovel, 17 cu.yd.
5561 Marion shovel, 35 cu.yd.
10-W Monighan dragline, 12 to 14 cu.yd.

Loading behind the 300-E will be a 44-B (3-cu.yd.) Bucyrus-Erie; behind the 550-B, a 54-B (4-cu.yd.); behind the 5561, a 4160 (7½-cu.yd.) Marion; and behind the dragline, a 361 (2-cu. yd.) Marion. The dragline and 361 Marion are diesel-powered. The rest are electric.

Coal is hauled to three tipples by seven Dart trucks, six Euclids and two Macks, all with a rated capacity of 15 tons each. The Darts are gasoline-powered and the others are diesels.

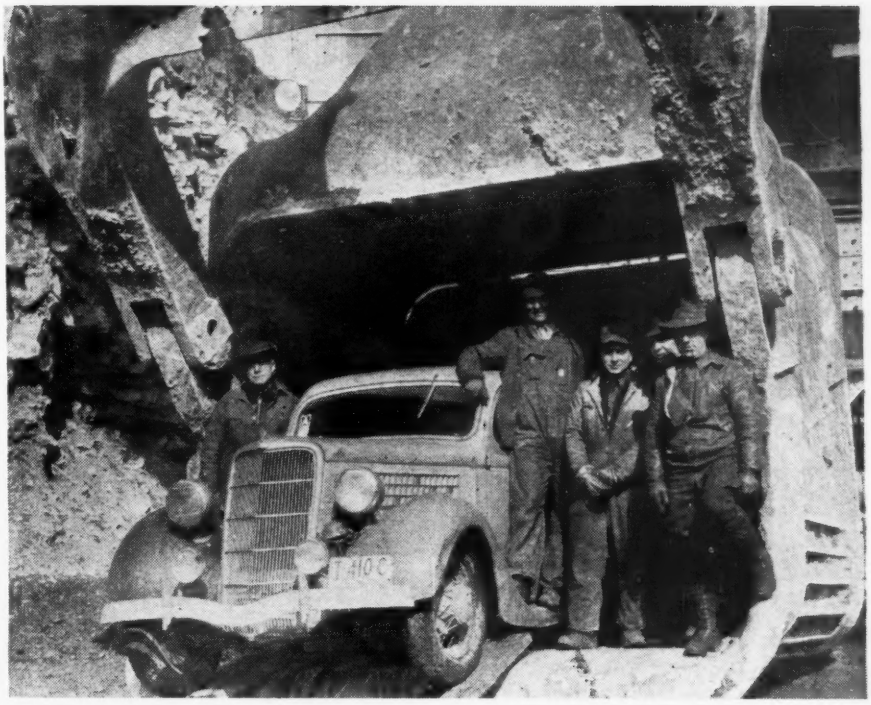
Two 29-T and three 42-T Bucyrus-Monighan drills, all carrying 9-in. tools, complete the Georgetown equipment list. L.O.X. and dynamite are used for breaking the bank and drilling normally starts after the 35-ft. cover line is reached.

Will Strip up to 80 Ft.

The 8-cu.yd. shovel strips to 40 ft. of cover, the 17-cu-yd. unit to 54 ft. and the new 35-cu.yd. machine to 58 ft. The dragline, in virgin stripping, will work to an average of 35 ft., but at least 40 percent of the time it will operate in tandem with the 35-yd. shovel in rehandling spoil, either with or ahead of the 5561. By this method, overburden up to 80 ft. can be handled.

During the time it is working with the 5561, Hanna officials estimate that the dragline will handle 30 percent of the overburden between the 60- and 80-ft. cover lines. The rest of the time the dragline will be used in virgin territory. The reason for tentatively limiting the dragline to a highwall height of 35 ft. is that this confines its activity to a territory that does not require drilling and shooting. Mine officials intend to use a 12-cu.yd. bucket on the dragline in virgin stripping, possibly going to a lightweight 14-cu.yd. bucket in rehandling spoil.

Merchantable coal is found at the 9-ft. cover line at the Georgetown pit, and the ratio of yards of overburden to be handled per ton of coal between the 9-ft. and 80-ft. cover lines is about 10.3. The seam is the Pittsburgh No. 8, dipping southeast about 16 ft. to the mile.



Five men and an automobile try out the 35-cu.yd. dipper for size. Left to right are E. V. Heffelfinger, Marion Steam Shovel Co.; Boyd Young, Jack Wise, F. A. Howe, superintendent; and J. S. Harmon, strip-mining superintendent, Hanna Coal Co.

Three tipples are now in use and a fourth is to be constructed by July. The tipples are located to reduce haulage to a minimum. Working with only one tipple, a round-trip haul of 13 miles would be necessary from some sections of the field. Three railroad sidings had to be built to serve the extra tipples. The operation is on the Wheeling & Lake Erie Ry.

Coal is moved to the tipples by the truck equipment previously listed and for all but a short distance it is hauled on coal. A 35-ft. coal berm is left after each pass as a haulageway. There is less than a mile of road outside the pit which the trucks use to reach the tipples. To cut down time and transit distance even more, it is the policy at Georgetown to make haulage fills across hollows wherever possible and practicable. Seven such fills have been made so far.

About 40 percent of the coal to be mined this year will be shipped by rail to the Dun Glen No. 11 washing plant, ten miles away. The rest will be hand-picked and shipped directly.

All power for the field is purchased, but the company has erected cross-country pole lines to distribute it to the various equipment units. A substation was built in the center of the field to minimize line drop. Cables from the pole lines transmit power to the shovels.

Little water trouble is experienced at Georgetown and not a day has been lost since the field was opened because of water in the working places. Mine officials intend to place reinforced-concrete pipe through the spoil bank at low spots in the pit to remove water wherever low working sections are encountered.

Coal thickness at Georgetown is about 4 ft. 6 in. and the yield is about 7,000 tons per acre. The field outcrops along its outside perimeter and is extremely irregular along the outcrop because of projecting fingers. The usual method of mining is to work along the outside of these fingers, making successively shorter passes toward the center of the field until the line has been virtually straightened.

The overburden contains a fairly large percentage of limestone and Hanna officials estimate that nearly 75 percent of the cover is limestone and other rock.

The engineering department under E. L. Mills makes pit extensions monthly and prepares an estimate in advance for the ensuing month separately for each stripping unit. The yardages of overburden to be removed by each unit also are figured monthly. General superintendent of all Hanna stripping operations is J. S. Harmon. F. A. Howe is superintendent of the Georgetown operation. Russell McHugh is in charge of mining engineering at all Hanna strip mines.

OLD MINE PUMPED

By Inside Station and Hole Through Pillar

Pillar Hole Cheapest and Quickest of Several Dewatering Methods Considered—Explosion-Tested Drilling Equipment Employed—Very Little Water Leakage Encountered When Accumulation Was Tapped

By J. H. EDWARDS
Associate Editor, Coal Age

DRAINING an adjoining abandoned mine by horizontal boreholes through the barrier pillar is nearing completion at the Isabella (Pa.) mine of the Weirton Coal Co. After a thorough study of several obvious schemes, this method, which entailed construction of two new underground pumping stations at the boundary in Isabella mine, together with vertical boreholes for water discharge and power cables, was concluded to be the cheapest and quickest, but its safe execution called for special precautions against water pressure.

The occasion for the project was a recent acquisition of an adjoining coal tract, part of which had been mined. These old workings, filled with water with a head of 50 ft., had to be drained to give access by underground haulage to the unmined coal of the new tract. Cover depth where a deepwell turbine pump could have been installed was 450 ft., but dewatering by that obvious method was ruled out because of slow deliveries at that time on deepwell turbine pumps and a higher cost.

The Isabella mine, operated with Whaley "Automat" track-mounted loaders and producing a large tonnage per day, is a slope operation below water level in the Pittsburgh seam. Cable-reel locomotives and all machines that work inby the trolley wire are explosion-tested or permissible.

One of the new pumping stations is equipped with a 500-g.p.m. centrifugal unit driven by a 75-hp. d.c. motor. The larger, shown in the illustrations and the principal subject of the following discussion, is at "65 North Borehole" and consists of a 1,000-g.p.m. centrifugal driven by a 200-hp. a.c. motor. Two pumping stations, a mile apart, had to be installed because a hill in the old workings prevented complete dewatering from one point.

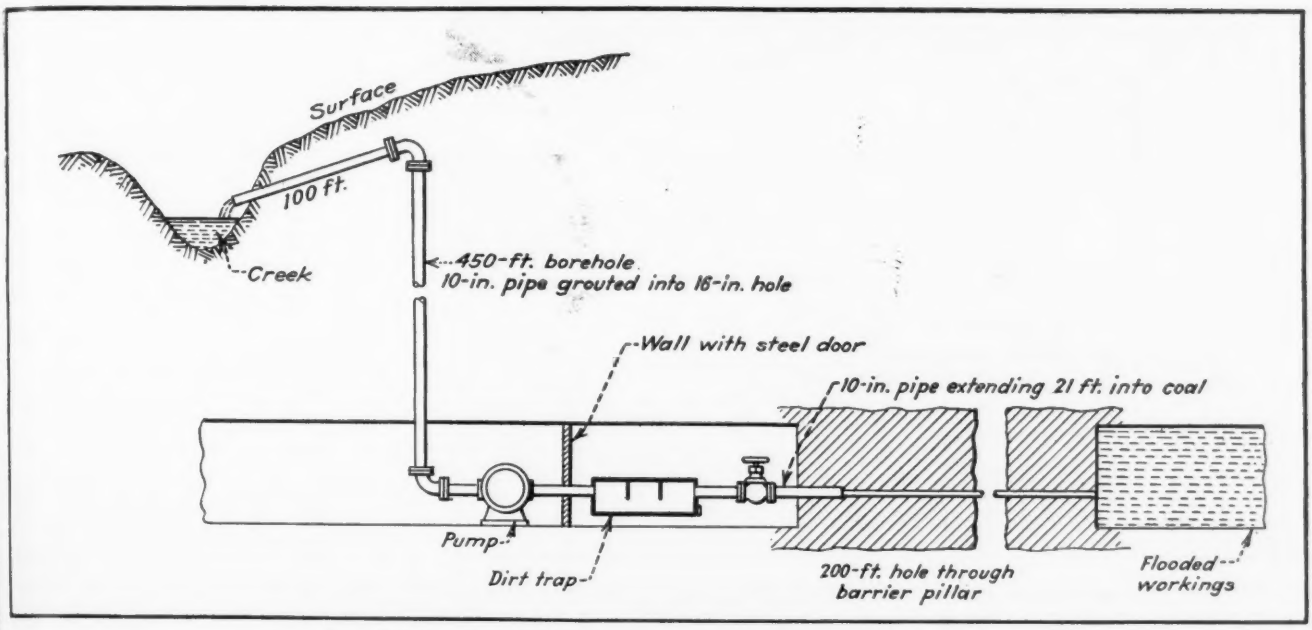
Room where suction connects to the horizontal borehole through the barrier pillar. The concrete-block stopping, with a hole revealing the valve and anchor braces, was erected to prevent tampering with the valve while the station was being completed. Entrance door to this room is kept locked. Dirt trap in right foreground.

Drilling an 8-in. suction hole 210 ft. through the pillar was contracted to Hoffman Brothers Drilling Co., which employed explosion-tested equipment with a hydraulic feed. The inby 189 ft. of this drilling was done through a 10-in. pipe extending 21 ft. into the coal. It was grouted into a 16-in. hole and further anchored by two vertical braces set in concrete in top and bottom. Preliminary to this drilling a set of entries had been driven and stopped 200 ft. from the old flooded workings.

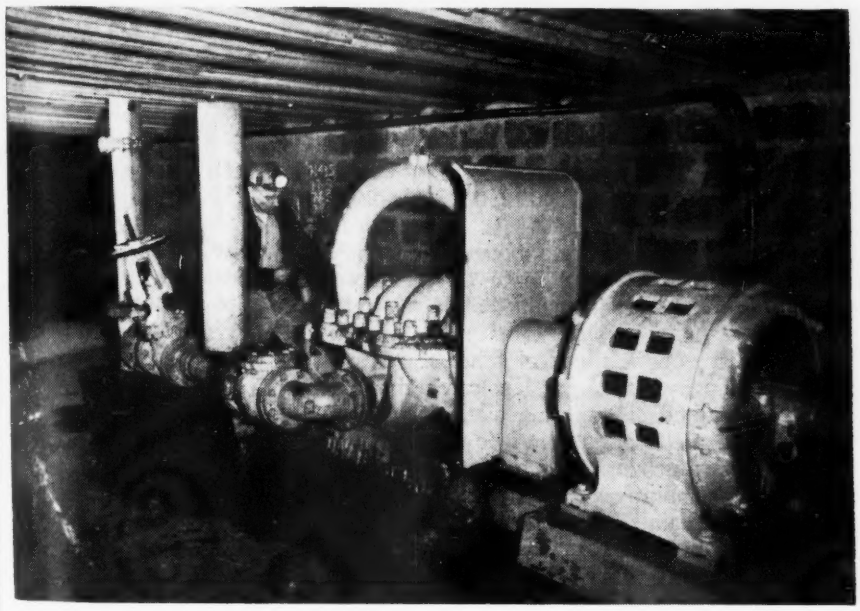
Only 2 or 3 gal. of water was admitted when the 200 ft. of drilling rods and cutting head were withdrawn after piercing the pillar and tapping the standing body. This was accomplished by having a large pipe chamber and stuffing box attached outby the gate valve on the pillar hole. A 3-in. nipple was welded on the lower side of this chamber and to that was attached a 3-in. valve. When the pillar was pierced this 3-in. valve was closed immediately. Then, after the drill rod and cutting head were drawn back far enough to clear the main shut-off valve, the latter was closed. The stuffing gland was then removed and the drill head withdrawn completely.

After this drilling had been finished a solid concrete-block stopping was built in front of the main shut-off valve as insurance against the possibility of anyone tampering with it and flooding the mine. Not until other construction work on the station had been completed was the stopping broken into for connecting the pump suction pipe to the valve.

In the completed job the outby end of the 12x60-ft. room where the suction pipe connects to the valve is closed off by a steel door which can be opened only by unlocking a padlock



How flooded adjacent operation was pumped out through Isabella.



The 4-stage pump is rated at 1,000 g.p.m. at 1,760 r.p.m. against a 507-ft. head. The larger vertical pipe is an air chamber to cushion shock of the water column upon stopping the pump. Farther back is the 8-in. discharge to a 450-ft. borehole.

on the inside and reached via a handhole through the door. In this room and connected in the suction line is a cylindrical dirt trap 20 in. x 6 ft. with an 8-in. clean-out handhole below the pipe connection at the inby end.

Water at the borehole discharge is only slightly acid, testing ph 6.5, but down in the slope which gives access to the old workings the water is ph 3.5 due to contact with air.

The pump is a Dayton-Dowd all-bronze unit rated at 1,000 g.p.m. at 1,760 r.p.m. against a 507-ft. total head. The 200-hp. Allis-Chalmers motor is a used unit that was rewound from 2,300 to 4,000 volts for this job. The 8-in. steel discharge pipe, 450 ft. vertical to the surface, is grouted in a 10-in. borehole.

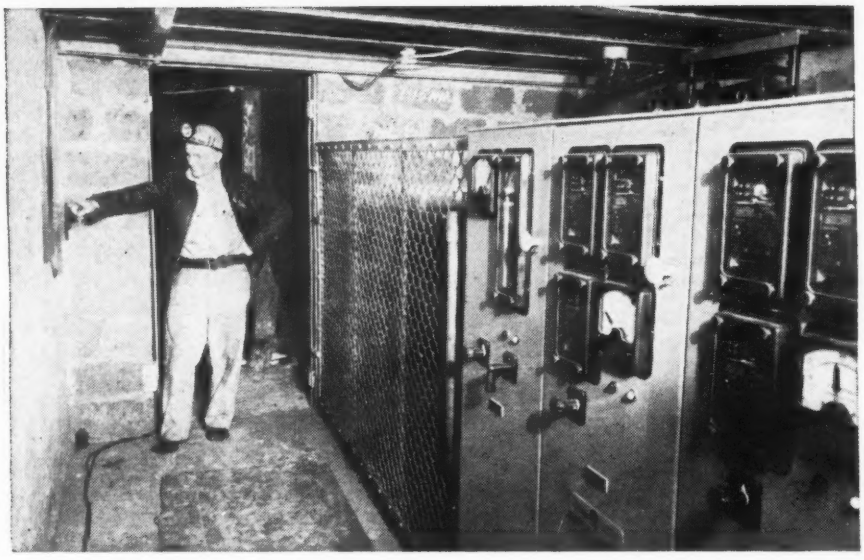
At the top this borehole is not visible. Three feet below the surface of the ground it connects with a buried line carrying the water 100 ft. downgrade to a creek bank. This method of preventing children from throwing rocks into the boreholes and of discouraging tampering also is used above the other new pumping station, but in that instance the buried pipe is 250 ft. long. Serving still another pumping station at the mine is a borehole discharging to a creek and constructed so that it is not visible even though a large quantity of water is being pumped.

Bottoming into the control room adjacent to the 65 North station is another 450-ft. borehole cased with 3-in. steel conduit grouted in. It contains a No. 4/0 three-conductor power cable, a two-conductor telephone cable and a four-conductor control cable. In addition to the pumping station this power cable supplies two 300-kw. Ignitron substations, one 4,500 ft. and the other 7,700 ft. distant.

Borehole cable could not be secured so a ribbon-armored cable was used supported by two $\frac{5}{8}$-in. steel messengers. The bundle consisting of power cable, telephone cable, control cable and two messengers is seized every 3 ft. for the first 50 ft. at the top of the borehole. Below that, for 50 ft., the seizings are 6 ft. apart. For the next 50 ft. the spacing is 9 ft. and for the remainder 12 ft.

For the control room three new General Electric steel-clad switch-gear units were purchased. Their duties are incoming, pump-feed and cable-feed. The pump motor starter is Westinghouse. A power-operated oil switch at the top of the borehole, with a control button down in the control room, provides a ready means of cutting power off the borehole cable in case of an emergency or maintenance job. At both top and bottom of the pole where the breaker is located are telephones connected to the mine system. In case of trouble or work on the line this permits keeping in constant touch with the dispatcher or chief electrician during progress of such work and transmission of orders for opening and closing breakers.

Pumping was started during Septem-



In the pump-control room the chief electrician is pointing to the control button by which a circuit breaker on the surface can be opened to kill the borehole cable. The bottom end of the borehole conduit can be seen over the center of the middle panel of the metal-clad switchgear. To the right and just over the tops of the panels are the pull eyes of the disconnect switches.

ber, 1943, and it was estimated that it would be finished about April 1, 1944. Actually the 1,000-g.p.m. pump went on air March 14 and thereafter has been operating about 1 to 1½ hours each night to take care of the accumulated daily water. On the other hand, the 500-g.p.m. pump, one mile away at 55 North borehole, is still pumping and the indications are that the remaining pool of water in that part of the mine, which is separated by a hill from the main part, will not be emptied until about June 1.

Before dewatering started the entire Hustead Mine was filled with approximately 315,000,000 gal. and, as the mine sloped toward Isabella, there was a 50-ft. head at the points adjacent to Isabella, but the water tailed out due to a rise in coal seam elevation until at the other end of the mine it did not quite reach the foot of the Hustead slopes.

As dewatering progressed, exploration trips were made through the Hustead slopes until the water had receded about 1,500 ft. After that point was reached the waters could no longer be followed because blackdamp prevented, as there was no ventilation in this old mine except the natural ventilation through the two slopes.

From that point on the lowering of the water was calculated by stopping the pumps and putting a pressure gage on the suction lines. After it was determined by readings of both pumps that the remaining water in the mine was divided into two pools and that the main entries of this mine, which came close to the Isabella workings about half way between the two mile-apart boreholes, should be entirely dry, as they were on the hill between the two parts of the mine, entries were then driven from Isabella about 250 ft. toward these mains.

Boreholes 20 ft. long were made in the face of each working place approaching the Hustead mains, and also 20-ft. holes angling to the right and left, before any cut was made. When these holes finally tapped the Hustead mains, it required about three weeks to dewater a small pool at the face of these entries, which was due to their dipping at that point. After this small pool had been drained, the Isabella entries were then carefully driven up until there was less than 5 ft. of solid coal between the faces.

Then on Sunday night, when there was no other work going on, a small crew of bosses, all trained in mine rescue work and use of oxygen apparatus, took out the remaining coal by pick work. No machinery was used in the final operation and all power in that section of the mine was shut off, as it had been determined through the boreholes that there was upward of 2 percent of methane in the Hustead workings. The final opening was made by men using picks and wearing the oxygen helmets, as described. This precaution proved quite necessary.

In the meantime stoppings, air-lock trap doors and a regulator had been constructed in Isabella, so that as soon as the mines were holed together a controlled amount of air could be circulated through the Hustead slopes into the Isabella returns in such manner as not to affect the working sections. Approximately 10,000 c.f.m. was thus drawn through the old workings until the mains had been sufficiently cleaned to make the oxygen content normal and enable men to work without the use of apparatus. This took three weeks.

Following this the opening between the two mines was enlarged to full size and track was laid into the old mine so that men could use a mule and light push trucks to transport material into these workings to build and repair stoppings to separate the unventilated portions of the mine from the main entries and permit making the main entries in Hustead mine an additional fresh-air inlet to Isabella mine. This work is now in progress and before completion will be supplemented by driving the entries at the two boreholes so as to again tap the Hustead mine at those places.

By connecting through near the two boreholes, the remaining part of the mine can then be ventilated, although these two connections will go direct to the main returns, which, in turn, will take any possible pressure off the stoppings along the Hustead mains that will conduct fresh air into Isabella.

Near each of the two new pump-rooms are entry-width, or 12-ft.-wide, sumps 5 ft. deep and 60 ft. long. These collect all seepage water coming through the pillars, and after the old workings are completely dewatered they will serve as the regular suction sumps for the stations. In each new station a Gorman-Rupp self-priming centrifugal pump picks seepage water out of the sump and discharges it into the suction line of the main pump. In one station (55 North) the 5-hp. unit is operated continuously to supply sprinkling systems in two mining sections. A bypass through a spring relief valve connects its discharge to the suction of the main pump.

The power factor of the 65 North borehole load originally averaged 88 percent. By moving a 150-kva. capacitor from the Isabella power connection to the pumproom, it was improved to 94 percent with the 200-hp. pump running continuously, and to 97 percent after draining was completed sufficiently so that it was necessary for this pump to operate only about 75 minutes in the off-peak period.

Pump and controls rooms are walled with concrete blocks and roofed with rails supporting corrugated-steel sheathing. The two rooms are adjacent and one wall of the pump-room is against the rib of the barrier pillar.

CABLE USE

For Safety, Efficiency and Long Life

*By PAUL M. BARLOW**
St. Albans, W. Va.

THE PROPER USE of conveyor cables and equipment results in efficient operation for maximum coal production, longer cable and equipment life and greater safety. This statement is made after many observations in mines. Some of the practices found are discussed below.

For convenience, a cable between portable equipment and the face distribution box is called the "trailing cable," while the outby cables from the distribution box to the room-neck are called "semi-permanent" cables.

SIZE AND LENGTH—The technical data on cable sizes are of importance, but for the safety inspector it is necessary only to make sure that cables are properly insulated, that they are operated coolly and that they are sufficiently strong mechanically.

Poorly made splices, extra long runs of cables, coiling or bunching, and low voltage all tend to cause cables to overheat. The point is made here that semi-permanent cable runs greater than 300 ft. from room-necks or cross-entries should be closely observed for heating. Permanent feeder lines should be brought to within 300 ft. of the face.

COILING AND REELING—On gathering locomotives, where the cable is constantly reeling on and off, there is some chance for the heat developed in the cable to be carried off by the surrounding air. However, when the cable is left reeled and load is applied, the heat developed is retained to a considerable degree. The effect of reeling on the carrying capacity of cable is shown in Fig. 1.

Thus it may be seen that a cable rated at 100 amp. capacity may safely carry only 35 amp. if reeled in four layers. It has been said that more reel cable is burned up (from overheating) than actually is worn out. Sad experience with reeled cables in conveyor set-ups soon proved that reeling was unsafe except on certain portable equipment.

*Formerly electrical engineer, West Virginia Department of Mines.

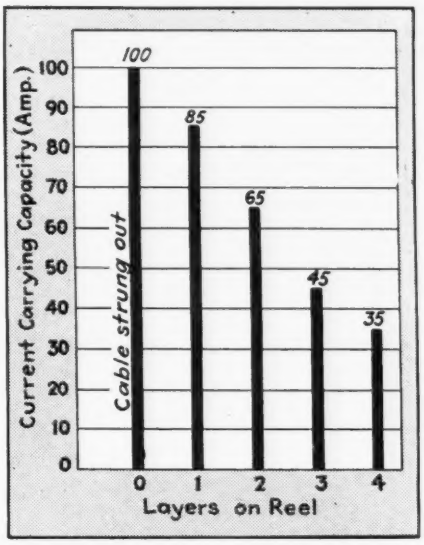


Fig. 1—Reeling reduces current-carrying capacity by preventing heat dissipation.

Some mines then allowed the piling or bunching of cable up to a length of 300 ft. Again experience showed that the heat was not fully dissipated, while a fire once started would quickly spread through the bunched cable.

The next step forward was looping (in figure 8 style) the excess cable on cross-boards nailed to props. This was an improvement but still heat developed and experience showed that the fire and fume hazards at room necks still existed.

Finally, the proved practice of using short lengths of cable was found to be the logical answer.

SHORT LENGTHS—Just as we use extension cords in our homes to bring power temporarily from a wall plug to a bridge lamp, so we can logically use short lengths of cable to extend power cables as the working face advances. Not all mines are using this short-length cable method, but as its advantages are known and as terminal connectors are made available, many mines are changing.

In one case a progressive mine was using short lengths in one section with satisfactory results. In another section new cables were installed in 300-ft. lengths. Plugs or connectors were not ordered at the time, since the management hesitated to "cut up" the new cable. A fire, caused by overheating of a bunched 300-ft. length of cable, occurred on the night shift. The next morning an inspector visited the scene of the fire. A discussion was held on the merits of using short lengths of cable and the management voluntarily decided to establish the method.

The advantages of using short lengths of cable are:

1. Cables are easily handled.
2. Cables need not be cut with an ax should timbers accidentally be set in a manner to prevent ready retreat.
3. Cables are added only when needed. Eliminates cable coiling at room necks. Eliminates keeping power on long lengths of cable unnecessarily.
4. Fire and fume hazard due to coiling not only is reduced but practically eliminated.
5. Prevents unnecessary wear and tear on cables.
6. Splicing is made easier through the use of prepared spare lengths, allowing the damaged lengths to be returned to the shop for repair and vulcanizing.
7. Cable handling is more flexible because cables not in use can be interchanged between rooms.

The disadvantages of using short cables are much fewer than the advantages, as follows:

1. System is relatively new.
2. Connector problem is not altogether solved.

CABLE SUPPORT—The use of insulators on permanent cable lines is recommended, but semi-permanent lines, such as room cables, may be supported on wedges nailed to props. Cables should never be placed on nails, spikes or wedged against the roof by cap boards or wedges.

All cables with the exception of trailing cables should be supported opposite the clearance side.

Negative wires, whether bare or insulated, should also be suspended. The current that travels out must travel back and heating must be guarded against on both sides of the circuit. Many twisted connections have been found covered with dust or gob, thus becoming potential fire hazards. When all wires are suspended in an orderly fashion, the system becomes safer and good service is more readily maintained.

PRECLEANER

Materially Increases Washer Output

High Percentage of Non-Combustible Reaching at Times 90 Percent Clogged Cone—Picking Table With Jig Used for Precleaning Coal

OPERATING on bank material that today is running only 18 to 20 percent combustible and at times has dropped to as low as 10 to 11 percent, the Gilberton Coal Co., Gilberton, Pa., in the Southern Anthracite Region, has found a precleaner to be an economical means of boosting the output of the plant. This it does by making it possible for the main cleaning plant to operate more continuously and efficiently. Prior to the installation of this precleaner, the preparation plant at best was able to prepare only a little less than 3,000 tons of raw feed per seven-hour shift and usually fell well below that figure, because of the inevitable clogging effect when handling such an impure feed in equipment designed for precision separation of the domestic sizes.

To increase the tonnage, John B. Rich, president of the company, and his breaker superintendent, Elwood W. Jones, decided that a roughing-jig plant that would remove the higher-gravity material before it reached the domestic-size unit would be a profitable investment. This precleaning equipment has increased the raw-feed capacity of the plant to 4,000 tons or more in seven hours. At the same time, recleaning equipment was provided to increase recovery by re-treating washery reject after it had passed through rolls. This was installed in the precleaner structure.

The coal being reclaimed comes from the waste bank of the old Gilberton breaker, now no longer in existence. When freed from the refuse with which it is mixed in the culm bank, it has an ash content of only about 9 percent, which for Pennsylvania anthracite may be regarded as excellent. In the Gilberton mine, coal was being obtained from the Mammoth and Buck Mountain seams.

The Gilberton waste bank reflects both improvements in preparation methods and changes over the years in consumer acceptance of the smaller sizes as the technique and equipment of combustion has developed. In consequence, the dump that runs in places 10 percent coal will, when older and therefore deeper portions are reached, probably show 40 percent values. Meantime, the washer must handle such bank material as, for the nonce, the shovels and draglines can reach.

Gilberton's cleaning plant—precleaner-recleaner on left, preparation plant on right and culm banks in rear.

The present Gilberton washer was built by the Wilmot Engineering Co. in 1941 and is equipped with a 13½-ft. Chance cone to clean all sizes over buckwheat No. 1, a Wilmot 4-ft. Hydrotator for the latter size, one 5-ft. Hydrotator for rice, two 6-ft. Hydrotators for barley and No. 4 buckwheat respectively, and a 12-ft. Wilmot classifier for No. 5 buckwheat.

The precleaner was completed and put in operation last year. The bank coal is loaded by two ¾-cu.yd. Link-Belt speeders and one Link-Belt and one Northwest 2½-cu.yd. dragline. It comes to the preparation plant in 12-ton diesel-driven Mack trucks and is fed by a Wilmot feed pusher to a flight conveyor, 215 ft. long between centers, traveling on a 3½ to 12 pitch and driven by a 75-hp. motor at a speed of 120 f.p.m. The 12x30-in. flights are on 3-ft. centers. This conveyor lifts the raw feed to the top of the precleaner and discharges it to a two-deck bull shaker, the top deck of which, with 4⅜-in. round holes, retains the steamboat and larger material; the second deck, with 2⅞-in. round holes, holds the broken, egg and stove, while the rest, or fines, pass through that deck.

From the top deck the steamboat-and-over goes to a lightly dished picking table where three or four men remove not the impurities but the coal, which is distinctly in smaller proportion than the refuse and is therefore the more easily removed. The picking table, however, has a final section that can be restored at any time, and then the coal will continue its travel to the end of the table and the refuse will be picked out.

In any event, the coal will move onto No. 1 rolls for primary crushing. It now reaches those rolls through what normally would be the refuse pockets.

The waste from the top deck of the picking table goes to a refuse pocket where, joined by smaller refuse, it is nudged periodically forward by a Wilmot pusher onto a chute from which it falls into a waiting truck below, which in turn hauls it out to the new refuse dump. Coal from the rolls has been cleaned so thoroughly by hand that it goes direct by the feed conveyor to the preparation plant.

Material from the top of the lower deck, being still "in the raw," goes to a Type E Wilmot Simplex jig with a capacity of 75 t.p.h. for a roughing separation that removes the coal from the slate and rock, which latter go to join the picking-table refuse on its trip to the rock pocket, already mentioned. The fines from beneath the lower deck of the bull shaker go direct to the feed conveyor and are carried to the preparation plant proper without precleaning.

The precleaner structure, as stated, houses also a recleaner for recleaning the refuse from the cone after it has been cracked in a secondary pair of rolls. This material is of egg, stove and nut sizes. To avoid having more than one delivery point for refuse, the wastes from the several Hydrotators and the classifiers also are brought to the recleaner, not for further treatment but solely for disposal on the new waste dump.

All these reject and refuse products are brought to the precleaner-recleaner by a scraper conveyor, 260 ft. long between centers, with 12x48-in. flights set 4 ft. 6 in. apart and traveling at a speed of 45 f.p.m. on a pitch of 1 in 2, the conveyor being powered by a 100-hp. motor. The refuse thus raised —egg, stove and nut—goes to a sizing shaker and thence to a duplicate of the other jig in the same structure. Arrangements are made so that the recleaner jig and the precleaner jigs can be used to clean both classes of material, thus circumventing trouble should either jig be out of operation. Slate and rock are taken to the precleaner rock pocket and thence find their way to the dump. The coal then travels to the main feed conveyor of the preparation plant.

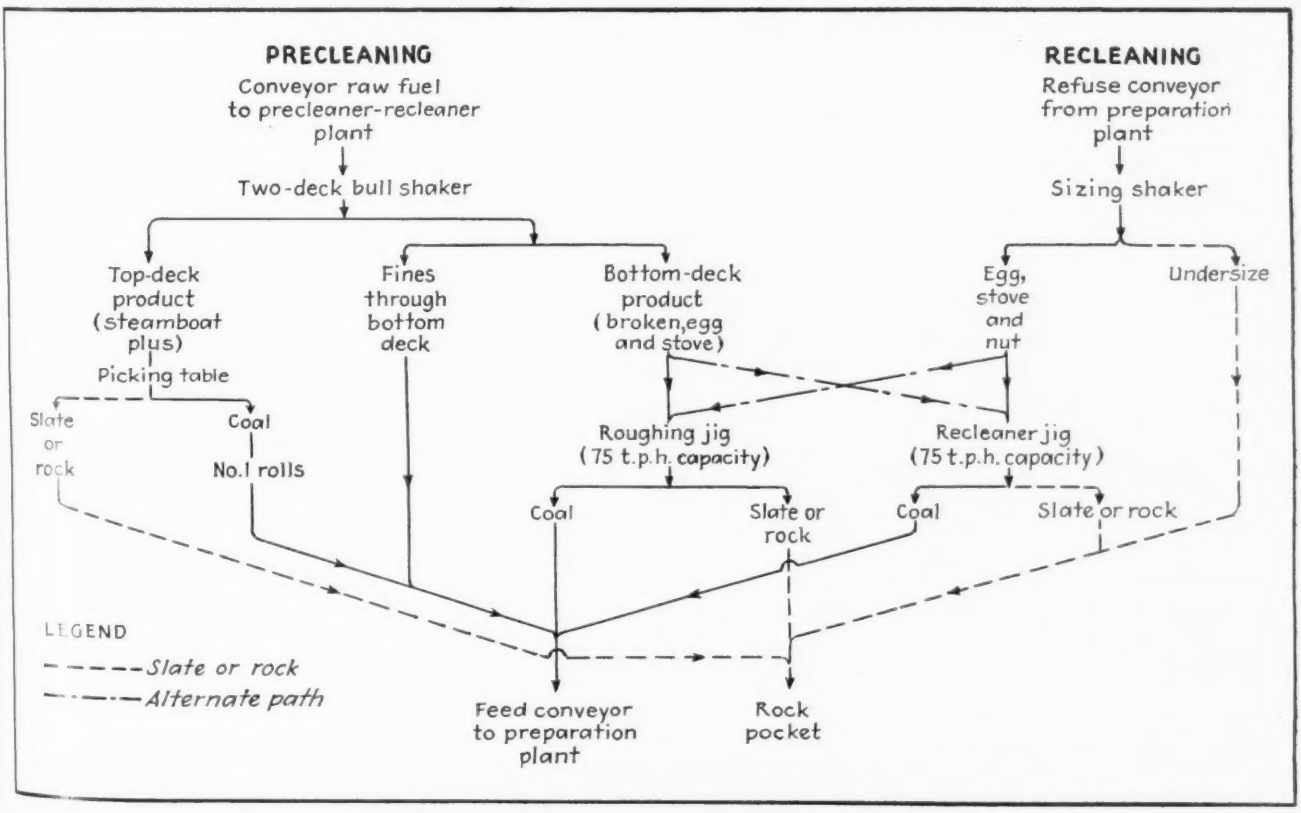
In the precleaner-recleaner structure, 3,100 g.p.m. of circulating water is used for jigs and sizing and 1,500 g.p.m. for make-up water. The main preparation plant requires 1,500 g.p.m. for make-up water. The main preparation-plant requires 1,500 g.p.m. of circulating water for the Chance cone and an equal quantity for the Hydrotators and make-up water.

As a result of the addition of the precleaner-recleaner unit, the quantity of raw bank material treated, which was 2,200 to 2,400 tons per 7-hour shift, is now increased to 4,000 and even 4,500 tons. The washer operates on two shifts daily and is producing about 800 tons per shift, of which about 160 tons is truck coal and 640 is transported by railroad. Because of the large feed conveyor to the pre-

Ash Percentages of Buckwheats at Gilberton Washer

Size of Buckwheat	Ash Percentage Obtained	Maximum Ash Percentage Usually Specified*
No. 1	9.24	12
No. 2 (Rice)	9.96	13
No. 3 (Barley)	10.06 to 10.56	13
No. 4	10.58 to 14.56	13
No. 5	13.84 to 14.28	15

*** The maximum ash percentages in the third column have merely been proposed but are not yet adopted. The Pennsylvania Power & Light Co. defines No. 4 as 3/64 x 1/32 in. and No. 5 as — 1/32 in. Other markets and the Anthracite Emergency Committee lean toward a specification in which No. 4 would be 3/32 x 3/64 in. and No. 5 would be — 3/64 in. In this article, the former size descriptions are assumed for No. 4 and No. 5 buckwheats respectively.**



Flowsheet of precleaner-recleaner plant at Gilberton, Pa.

cleaner plant and the facilities for handling large material in this structure four fewer men are employed at the bank for preparing the material, so the total force at the two plants is practically the same as served at the original washer, and the quantity of water used has not had to be increased.

Ash in the buckwheat No. 1, when cleaned and ready for shipment, is 9.24 percent; in the rice is 9.96 percent. Barley usually has from 10.06 to 10.56 ash; buckwheat No. 4 on three occasions ran 10.60, 10.58 and 14.56; No. 5 had 13.84 and 14.28 percent. The quantity of non-combustible in the Hydrotator refuse is 66 percent and has reached on occasion 69 percent.

In the precleaner-recleaner plant ten men are employed—four men on the picking table, one man on the main scraper line and on the bull and sizing shakers, one man at the foot of the scraper line running the pusher, one attendant at the rolls, etc.; one jig runner, one rock loader and one man at the bottom of the conveyor line to the recleaner.

In the cleaner plant also are ten men: one at the top of the main conveyor line, two shaker tenders, one cone runner, two Hydrotator men, one pump attendant, and three wood pickers who, incidentally, abstract 3 to 4 tons of wood per shift.

HAULWAY PROTECTION

All Locust With Cushioned Lagging

With bad top and some timbering over 20 years old, there still is no worry over roof falls.

VALUE of stitch-in-time maintenance using lasting methods and materials is reflected in the timbering of the main haulway in the 4,000-ton No. 3 mine of the Rail & River Coal Co., on the Ohio River, Belmont County, Ohio. Although an outby section of the haulway has been in use since the mine was opened over 30 years ago and the immediate roof consists of many feet of weak shale typical of the Pittsburgh No. 8 seam, it would be difficult to point to many other mines with haulways this long and where there would be less danger from roof falls. As in numerous old mines, side clearance is not up to modern standards but in all other features, including track and wiring, this haulway is outstanding.

John T. Sydnor, appointed president of the company a few months ago, thinks much credit is due the mine management of past years for maintaining the timbering of this difficult old haulway in such fine condition. E. F. Maurer, now general superintendent, was superintendent of No. 4 until recently. E. Dishong is now superintendent of this No. 3 mine and also No. 4, alongside.

Locust has been used exclusively for the legs, crossbars and lower layer of lagging. While the sets were not individually dated at installation, Mr. Dishong says that many of them have been in over twenty years.

For the entire distance these sets are on 4-ft. centers. With the exception of the older ones, which are being replaced from time to time, the legs are hitched back in the ribs flush with the coal and extend to the bottom. When top shale falls to the extent that the lagging bows with weight, it is opened and the fallen material "drained" off. Then the new lower lagging of locust is cribbed with a cushion of old ties, car lumber and so on.

In 1937 and 38 the track was relaid with 70-lb. rails on 5x7-in. creosoted ties (Wood Preserving Division, Koppers). Slag ballast was used for the first 1½ miles. Gage is 42 in. and is maintained by two steel ties at each joint. Two angle bars are used per joint and the bonds are the long type, arcweld, steel electrode.

Trolley wire is 350,000-cir.mil No. 9 deep-section grooved, locally termed "No. 6/0," and in this mine it is the negative or return side of the circuit. Along the rib on the trolley-wire side and supported on porcelain insulators attached to the legs are three 500,000-cir.mil cables with weatherproof insulation. Two are negatives in parallel with the trolley and the third is a positive in parallel with the rails.

This reversed polarity came about a few years ago when a General Electric portable ignitron rectifier (275-volt, 300-kw.) was installed to operate in parallel with existing motor generators. It is inherent with rectifiers that the tanks or tubes be connected to the positive side of the load. Therefore to avoid insulating them and making them live, it is the usual practice to reverse the mine power and connect the tanks to the track. Although of portable type and ready for underground duty, this rectifier is still being operated in its original location on the outside at the top of the main slope (*Coal Age*, October, 1941).

Three 15-ton Westinghouse 3-truck locomotives each pulling 55-car trips travel over this 4-mile haulway in No. 3 mine. Cars are of two sizes, carrying 2 and 3 tons as loaded at the belt stations. Both development and mining are done with Goodman duckbills (*Coal Age*, October, 1941).

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COAL AGE

announces

Coal-for-Victory

AWARDS

★ ★ ★ ★ ★ ★ ★ ★ ★

COAL is being called upon this year to produce the colossal amount of 691,000,000 tons. That is nearly 200,000,000 tons more than in 1940. It must be produced with 80,000 less men. Achieving this goal—42,000,000 tons or 6½ percent more than 1943—means shattering every production record ever set or considered.

Other industries, showing no greater efficiency and often less spectacular results under more favorable circumstances, have been given deserved public recognition of their war contribution.

The brilliant production record which coal is making—which it will continue to make—richly deserves equal recognition.

Therefore,* COAL AGE, *with the support and cooperation of the SOLID FUELS ADMINISTRATION FOR WAR, is happy to announce its

"Coal-for-Victory" Awards

Every serialized mine in the United States which was in production in 1943 and 1944 is eligible to qualify for the awards. To recognize meritorious achievement in more efficient production as well as tonnage, any serialized mine that otherwise qualifies under the rules is eligible for one or both of the following:

1. The "War Production Efficiency Award," to be presented to mines or collieries

CHALLENGE and OPPORTUNITY

The nation's coal mines are being asked this year to perform an unprecedented feat of production. As the demands for war material mount with the offensives on every front, coal must be supplied to insure their being met.

The Solid Fuels Administration for War has asked the nation's mines to produce 691,000,000 tons of coal in 1944. SFAW well realizes that this is a tremendous order. But SFAW would not have made the request unless it were convinced of the urgency of the need.

Lack of manpower, scarcity of some materials, the advancing age of workers at the mines and many other factors make the job ahead a big one. But I am sure the industry will strive to meet this challenge with the same courageous and patriotic spirit with which it has met all others since the start of the war.

The coal industry may well be proud of its record of achievement over the past two years. But pride in past accomplishments is not enough. Production must be increased. In view of the pressing need, the Solid Fuels Administration for War believes any plan that will help stimulate production should be thoroughly explored and encouraged. I feel sure the *Coal Age* awards for meritorious work in increasing efficiency and producing more coal will not only give recognition to an industry making a valuable and vital contribution to the war but will also provide an incentive to produce the added tonnage which the nation so badly needs this year.

C. J. POTTER,
Deputy Solid Fuels Administrator for War

increasing fresh-mined output per manshift by 10 percent or more in the calendar year 1944 as compared with the calendar year 1943.

2. The "Victory Production Award," to be presented to mines or collieries exceeding their 1943 calendar year fresh-mined output by 6½ percent or more in 1944.

The certificates to be awarded qualifying mines or collieries are reproduced on page 4 of this announcement. In addition, individual certificates attesting their part in reaching or exceeding the required efficiency and production goals will be awarded all members of the supervisory staff of each mine or colliery winning an award or awards. If the company operating a winning mine or mines, or colliery or collieries, so desires, buttons for employees will be made available by *Coal Age* at cost.

Coal Age has inaugurated these awards with two thoughts in mind:

1. Stimulation of vital coal production in this critical third year of the war.

2. Fitting recognition of the exceptional contribution to the war effort of the coal industry, its operators and its employees.

While the awards are made as a contribution toward winning the war, the benefits to coal will be lasting. More efficient methods of production, greater mechanization and better utilization of manpower and machinery add up to a solid investment for the postwar future. Increased output to meet every war and essential civilian need will insure good will for coal and a higher standing with the public growing out of a job well done.

Every extra ton of coal mined in 1944 will help bring victory that much nearer. It is the patriotic duty of every man in coal mining—operator, supervisor and miner—to push harder on the home front so that our fighting forces can advance faster on the battlefronts. Perhaps every mine or colliery cannot win a "Coal-for-Victory" award, but every mine can try. Remember: Coal fights on every front!

Additional copies of this award announcement will be supplied to coal-company and mine officials upon request to Coal Age, 330 West 42d St., New York 18, N. Y.

HOW YOUR MINE CAN WIN THE "COAL-FOR-VICTORY" AWARDS

1. Any mine or colliery in the United States that has a War Production Board serial number and was open for production in the calendar years 1943 and 1944 is eligible to compete for the "War Production Efficiency Award" or the "Victory Production Award" or both.

2. The "War Production Efficiency Award" will be presented to any serialized mine or colliery otherwise qualifying that increases its fresh-mined output per manshift 10 percent or more in the calendar year 1944 as compared with the calendar year 1943. This award is intended to recognize outstanding achievement in promoting efficiency by the methods normally employed and judging shall be not alone on the results but also on how they were achieved. Mines filing for the "War Production Efficiency Award," therefore, shall supply a statement outlining how the increase in output per manshift was obtained and shall agree to supply, upon request, such additional information as may be required to permit a decision to be reached.

3. The "Victory Coal Production Award" will be presented to any serialized mine or colliery otherwise qualifying if its fresh-mined coal production in the calendar year 1944 exceeds its fresh-mined coal production in the calendar year 1943 by 6½ percent or more.

4. More than one mine or colliery operated by any one company is eligible for and may receive either or both awards if they otherwise qualify. The winning of an award, or awards, by one mine or colliery operated by a specific company shall not prevent another mine or colliery operated by the same company from also winning one or both awards if it otherwise qualifies.

5. The awards to mines or collieries will consist of certificates attesting their contribution to the war effort by exceeding 1943 calendar-year production or output per manshift by the required percentages in 1944. Individual certificates also will be awarded each member of the winning mine's or colliery's supervisory staff attesting their contribution in helping the mine or colliery to win an award or awards. Should the operating company so decide, buttons for each employee at winning mines or collieries will be made available by *Coal Age* at cost.

6. Qualifications for the awards shall be judged on the basis of statements submitted by authorized officials of the companies operating the mines or collieries in question on official forms to be supplied by *Coal Age*. Statements must be completely filled out and must be filed on or before Jan. 31, 1945. Postmarks shall be the guide in judging acceptability under this restriction.

7. *Coal Age* reserves the right to request from appropriate government or other statistical agencies certification of production and other figures submitted by coal companies filing for an award or awards, and such companies shall agree that statements are submitted subject to such certification.

8. A board of judges nominated by *Coal Age* shall be the sole judges of the qualifications for awards and coal companies filing for the awards shall agree that their decision shall be final.

9. Realizing that changes arising out of the course of the war might materially alter conditions, *Coal Age* reserves the right, if it should appear to be necessary, to modify the terms and conditions of the awards or adopt new terms and conditions, to the extent necessary to permit giving proper recognition for meritorious work in supporting the war effort.

10. Announcement of the awards will be made as soon as practicable after the final date for filing.

War Production
EFFICIENCY AWARD

COAL AGE Presents to the Officials and Employees of

This certificate in honor of their outstanding contribution to the national war effort in the form of increased productive efficiency in 1944 above and beyond the average for the industry, thereby materially advancing the cause of victory for the United States and its Allies.

Victory Production
AWARD

COAL AGE Presents to the Officials and Employees of

This certificate in honor of their outstanding contribution to the national war effort in the form of increased coal production in 1944 above and beyond the national goal, thereby materially advancing the cause of victory for the United States and its Allies.

PUBLISHER, COAL AGE

EDITOR, COAL AGE

DATED:_____

FOR ACHIEVEMENT IN EFFICIENCY AND PRODUCTION—In addition to these mine awards, *Coal Age* will award similar certificates to members of the supervisory staffs at winning mines or collieries

RAIL HAULAGE
Finding Its New Place in Strip Mining

With Added Experience in Truck Transportation, the Place of Rail Haulage in Strip Mining Begins to Show Clearer—Present Trend Is to Dual Rail-Truck Installations for Larger Mines

By FRED W. RICHART
Assistant Editor, Coal Age

TRANSPORTATION of coal at strip mines is a very live subject, with adherents to the various methods indicating their choice by what they do rather than by what they say. The changes being made in haulage methods in strip mines that have been operating for years is an indication of the mobility of thought as well as practice.

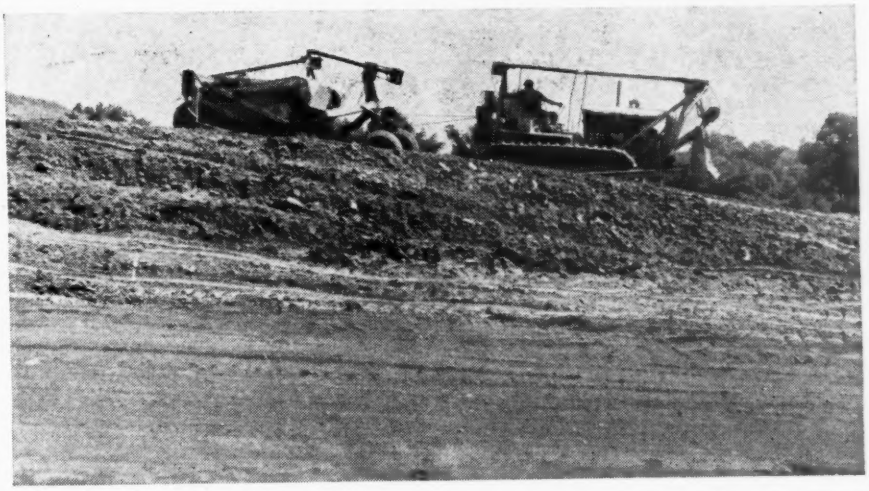
Notwithstanding the fact that big rubber-tired trailer trucks have caught the eye of a large percentage of strip-mine executives, there are those who still cling to rail haulage from pit to preparation plant. For example, a mine may be pretty well worked out and a change cannot be justified. Or, why scrap a smooth-working rail system and add a huge investment just to keep up with the Joneses?

Operators who have used both systems say that the rail haul has its place. Some go so far as to insist that rail haulage is cheaper than trucks. There is no doubt that mine and surface conditions, as well as mileage, have much to do with the comparative success of truck and rail haulage.

Without question the prevailing trend for large mines is toward truck gathering in the pit and rail haulage from a transfer station to the preparation plant. The validity of that statement is not altered by the fact that someone may immediately say: "There are big operators who use 50- to 80-ton trailer-trucks from loader to washery, and like them." There may be a dividing line on truck size that enters into this question. There is some evidence to support such a contention. Some day the answer may be known.

On the other hand, a locomotive specialist for one of the country's largest manufacturing concerns stood looking at some of the more moderate-sized trailer trucks climb the grade of a none-too-good road, and remarked: "I don't see how they can do that job with trucks." Others still wonder when they see what trucks sometimes are asked to do. The trend today indicates that that engineer had some basic ideas in the back of his head that still hold good.

Some of the early rail hauls consisted of standard-gage railroad track laid into the pit, with a small switch



Building the grade for a ½-percent-against-the-loads standard-gage track with 10-cu.yd. scrapers in revising a rail-haulage system from field tipple to washery to cut grade from the original 3 percent and obtain advantages of a double track. The completed part of the grade is to the left.

Transfer station loading common-carrier railroad cars from a truck hopper. This is a double-duty station. A small conveyor underneath loads road-building material dumped from the cars into trucks via a hopper under the track.

High-wall rail haulage—a common practice in the Kansas thin-vein fields. Other mines gather with trucks and fill the cars with an elevator reaching from the pit to a small tipple on the bank. With that type of loading the tipple moves are far apart.

engine or saddle tank locomotive to do the switching. The railroad furnished the cars, which were filled in the pit and immediately sent to market. This was simple and cheap. It still exists in some places.

The big complaint about track in the pit was that it took a huge section gang to shift the track from loading cut to loading cut and to keep it lined up well enough to prevent frequent derailment. One early convert to trucks gave as a reason for making the change: "Saves $100 a day in track labor." That mine had not used a bulldozer for track shifting. But since that date there have been mines where even the bulldozer did not save the rail haulage from being scrapped.

There are natural conditions which may favor one type of haulage or completely rule out another. A good illustration is the "bank" system of loading rail cars popular in the Pittsburg (Kan.) field. That rail system is said to be cheaper than truck haulage from the pit by operators who use both. The terrain is like a pancake and the wall stands up under the strain of train movement. The track is laid along the high wall very close to the cut where it is convenient for loading. Coal is lifted from the pit by a crane and dropped from the skip into the rail cars.

In any coal-stripping field may be found systems and machines that are used because they fit natural conditions. It often takes time to determine these conditions and adopt the best procedure. This is why expensive changes sometimes are made. Strip-mine operators, as a rule, are progressive about adopting new machines and methods that promise a profit.

Two Haulage Trends

Present-day rail haulage is along two lines. First, continuation of long-established haulage tracks from loading shovel to preparation plant; second, use of a dual system in which trucks gather and deliver to a transfer station and rail cars complete the haul to the preparation plant.

There are quite a number of all-rail haulage systems in existence, both standard and narrow-gage. Perhaps it is the general rule that railway cars are used on the standard-gage track, but some prefer their own 40- or 50-ton cars fitted with roller-bearing journals to cut down friction. Locomotives usually back into the pit with four or five cars, have them loaded, and head out for the preparation plant. Another train of empties is waiting on the siding nearby to take its place at the loader. The trend in this type of rail haul, extending from the loader to the washer, is out.

However, that is not true of the somewhat similar rail systems around Pittsburg, Kan., mentioned above. Here both standard- and narrow-gage rail systems reach to or near the loading point but do not enter the pit. Trains that run along the high wall stop opposite the loading shovel, where they are loaded with a crane (May, 1944, *Coal Age*). In the same area a second method of loading cars on the wall is to gather with trucks, dump at a transfer station in the pit and elevate the coal to a small tipple on the wall, where the rail cars are filled. One advantage of the transfer station is that the track need not be moved except at long intervals of time.

Narrow-gage cars in this area run from 6 to 15 tons in capacity and are fitted with roller-bearing wheels and drop bottoms. The steam locomotives are comparable with the cars for size. Track gages are 36 and 42 in.

Many—perhaps most—rail haulage systems use steam locomotives, although gasoline, diesel, diesel-electric and trolley-electric locomotives are employed. It is doubtful if a trend to any particular type has developed.

Among the interesting all-rail steam-haulage installations is the circular haulage system employed at one large stripping operation. When this system was changed from a "back-in" and "pull-out" haul to an entrance ramp at one end of the pit and an exit ramp at the other end, with one-way train movement, it boosted production by 30 percent. As to the cost of operation, compared to 100-percent truck haul in a companion pit, it is stated that the truck haul has not been able to meet the figures estab-

lished by the rail haul. The latter reaches the same point in availability as truck haul—no waiting for empties. As one train pulls out another pulls in. This robs the truck of one of its exclusive claims: "No lost time for the loading shovel."

Of equal interest is the trolley system at another large stripping plant, which is pronounced very economical after several years of service. The trains are made up of five 40-ton cars. The lead car is equipped with two 160-hp. motors which haul the train. Trucks gather for this rail haul.

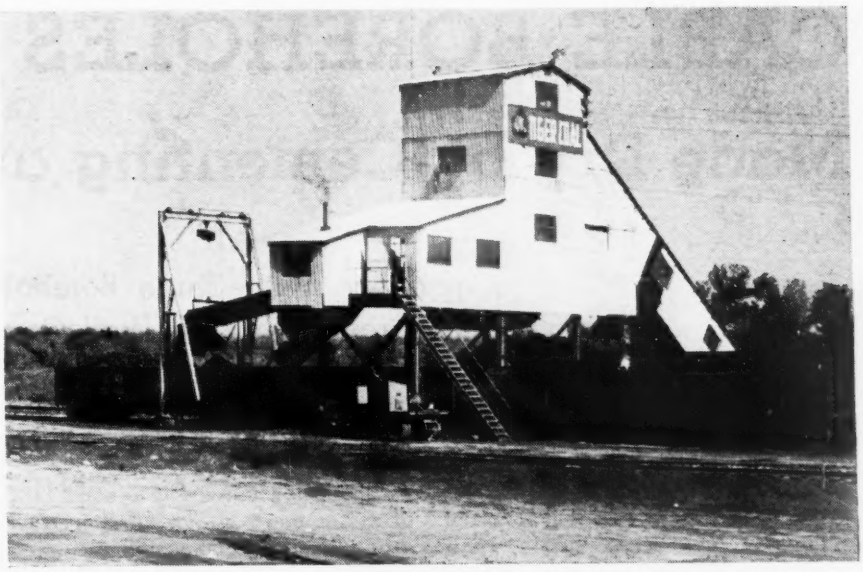
A Pittsburg (Kan.) organization uses truck gathering at one mine, with an elevator-type transfer station to elevate the coal from the pit to a surface tipple and standard-gage rail haul to the preparation plant. At the second mine trains on the high wall are loaded with a crane and skip which travel along with the loader. A small steam locomotive switches cars from the loading points of both mines to a siding where a standard railroad locomotive picks them up. At the washery cars are dumped in a large rotary dumper. This whole haulage system is a part of the coal company's equipment.

The recent purchase of a standard-gage 65-ton diesel electric locomotive for mine service marks the possible start of a new era in strip-mine haulage. Its present use is as a pusher to help small locomotives over a hill and to switch standard rail cars into and out of a screening plant built down in the pit (*Coal Age*, July, 1943).

Mines in several fields are adjacent to common carriers which take over the rail haul from transfer station to washer. In some instances the common carrier is owned by a group of mining interests and operated primarily to serve their properties. In other cases the work is done by trunk-line railroads on the basis of a switching charge and as a necessary service to originate the freight haul to market.

The size of rail cars is getting increasing attention. Several mine executives have stated that 6- to 15-ton cars are too small. While a few changes have been made, plans are in the files for action when the war has ended.

While much mine track is considered temporary—and looks temporary—the comments of mining men indicate that they appreciate the advantages of good track as the basis of a good rail haulage. The following brief description of some plans for the future, and some of the work already done, does not prove that a wholesale rehabilitation movement has been started. It does prove that past practice is not considered equal to the task ahead and that there are those who are already trimming their sails to meet the winds of tomorrow.



A double-duty tipple, screening two sizes of coal for the market and/or loading mine-run for the washery. The haul to the washery, several miles away, is by a trunk-line railroad. A fleet of 70- and 80-ton semi-trailers delivers coal from two strip pits.

Large-capacity transfer station in operation. One 35-ton truck is dumping. Coal is being loaded into the railroad cars on the mine's own track and the cars are switched by its own steam locomotive. In the background is a tower for floodlights for night loading. This station has handled approximately 5,000 tons in seven hours.

A part of this program has been put into effect. A new track paralleling the original haulage track from transfer station to the washery has been built with but one-half percent grade against the loads. Compared to the old 3-percent grade a given locomotive can haul three times the present train weight.

This double track, using the new track for loads and the old track for empties, eliminates all passing switches and consequent train delays and greatly increases locomotive capacity. When these plans are completed there will be no narrow-gage equipment. Seldom is a coal-mining company so conscious of the advantages of big cars, double track, low grades and rock ballast as to spend the money to obtain all of them.

But the idea is growing. The circular haul mentioned previously is the equivalent of a double tracked line. More than one superintendent has called the attention of *Coal Age* to track improvements he has made and has expressed the conviction that good track for rail cars is just as essential as good roads for trucks.

CABLE BOREHOLES

Made Dry by Cementing at Orient Mines

Experience With Three Boreholes for Cables 447 to 560 Ft. Deep Proves That Oil-Well Cementing Practice Will Prevent Water Inflow—Method Also Applied to Boreholes for Water

BOREHOLES for power cables through water-bearing ground are often troublesome and even unsafe when water has not been effectively sealed off. This is particularly true, where the holes are deep and static heads run high, if the water is permitted to follow the casing down to the bottom of the hole. This important link in the power set-up of a modern mine has received well-considered attention at the Orient mines of the Chicago, Wilmington & Franklin Coal Co., West Frankfort, Ill.

With an active oil field adjacent, there was an opportunity to test some of the refinements of oil-well cementing as practiced by experts. Three holes, put down to depths running from 447 to 560 ft., have demonstrated that this method will effectively seal off water flow, making the bottom of the hole where it enters the mine workings absolutely dry.

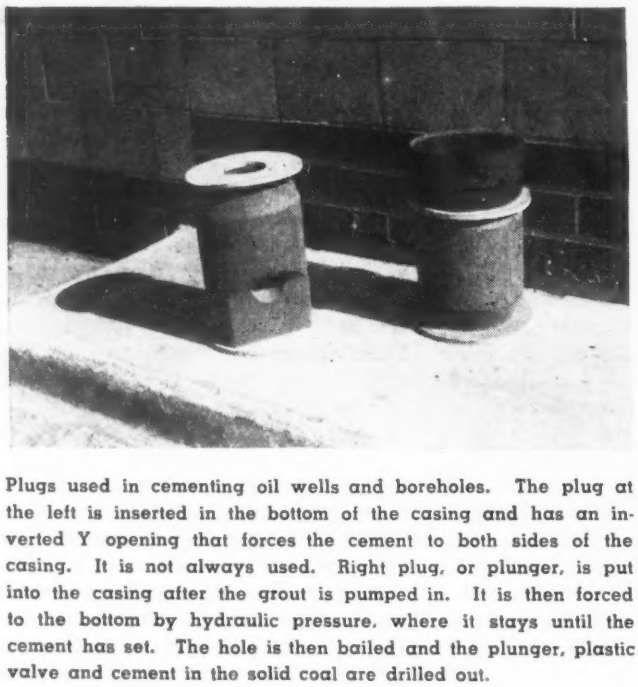
Fig. 1 shows the methods previously used and now employed to make boreholes for power cables on the Orient properties. A detailed description of the process of drilling and waterproofing these latest holes and installing the cables is given later in this article.

A further item of interest in the New Orient mine practice is the duplicate cable set-up. This is next to the 20-ft.-diameter circular concreted airshaft 2½ miles from the main shaft, at which point is set the Aerodyne fan ventilating the mine.

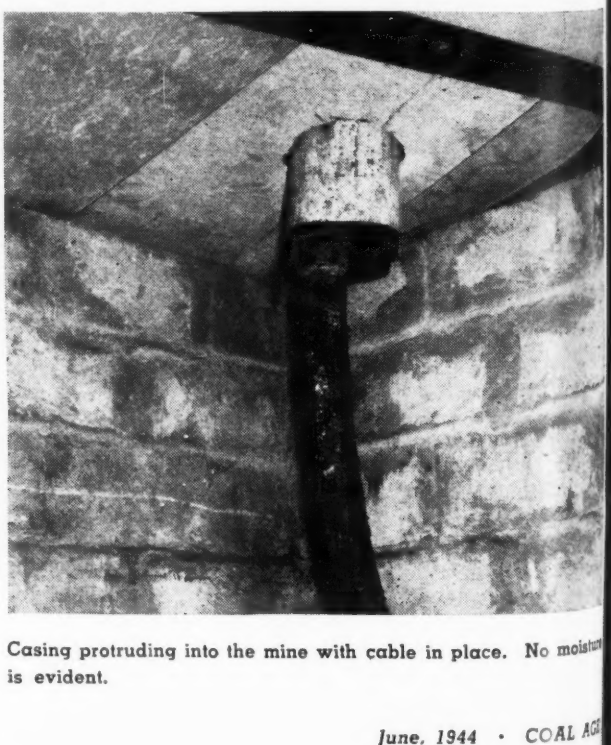
On the surface is a 4,000-kva. 33,000/4,160-volt 3-phase "Y"-connected grounded-neutral power transformer which supplies a.c. power to the motor-generator sets near the working faces of the mine. At this point two boreholes were drilled about 12 ft. apart. There were several reasons for using two 350,000-cir.mil three-conductor steel-wire-armored cables rather than one large cable.

The first reason is that a cable to carry as much current as two 350,000-cir.-mil cables runs to an unwieldy size, being larger than the maximum usually made. Incidentally, even a 750,000-cir.mil cable would carry less than 50 percent more current than one 350,000 cable. A second reason is that one 350,000-cir.mil cable will carry the load at that point as the working faces move ahead. At that time one cable will be salvaged and moved ahead to the advanced working area.

These holes were drilled with a churn drill, which does not always make a straight vertical hole, but the angle of deviation is slight and does not prevent the casing from following through. The first section through the soft surface was drilled for a 10-in. casing, which is set to prevent caving while the rest of the hole is drilled. The work is finished through the 10-in. casing with a 9-in. hole, which reaches into and through the solid coal



Plugs used in cementing oil wells and boreholes. The plug at the left is inserted in the bottom of the casing and has an inverted Y opening that forces the cement to both sides of the casing. It is not always used. Right plug, or plunger, is put into the casing after the grout is pumped in. It is then forced to the bottom by hydraulic pressure, where it stays until the cement has set. The hole is then bailed and the plunger, plastic valve and cement in the solid coal are drilled out.



Casing protruding into the mine with cable in place. No moisture is evident.

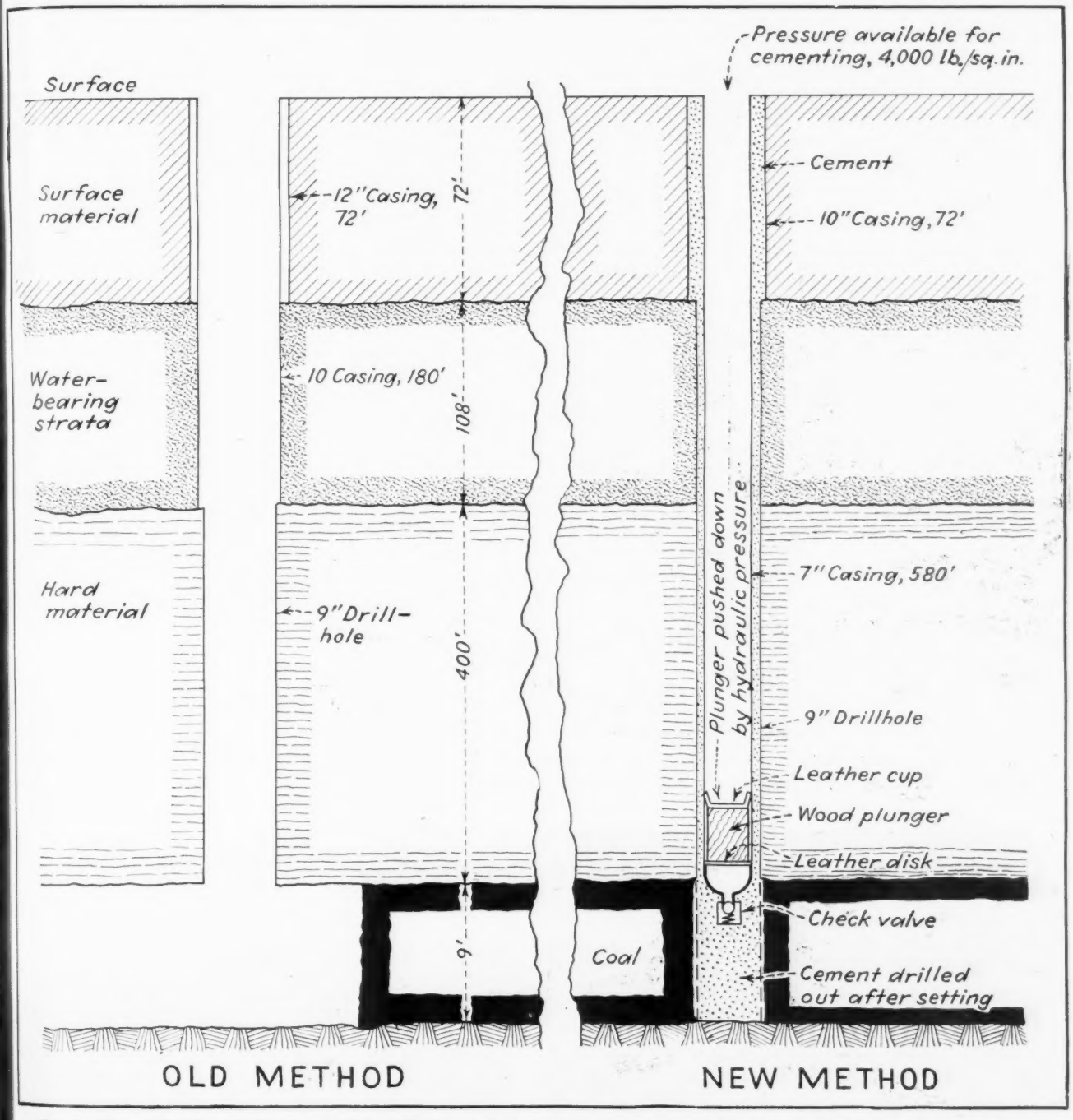


Fig. 1—New and old methods of putting in cable boreholes. Pressure cementing in the new method prevents water inflow.

vein. The reason for drilling into solid coal rather than into a mined area is that it aids in the job of cementing by providing a solid pocket for forcing the return of the cement up the outside of the casing.

When the cementing rig gets on the job the first move is to lower a measuring wire down the hole to get the depth. An attached weight keeps the wire taut. The depth is used for ascertaining from tables the quantity of cement required. This depth figure and the measuring wire also are used in setting a plug at the bottom of the casing, as described later.

The 7-in. casing (Fig. 1) is prepared now for lowering into the hole by attaching a plastic check valve to the bottom end to prevent the return up the casing of water or cement. This casing also has steel centering springs attached at intervals of about 100 ft. to hold it centrally in the hole while the grouting is being done. The casing is then lowered to near the bottom of the hole, hose attached and water pumped down until the upward flow between the two casings is clear. This clears the hole of drill chips and mud, making it ready for the cement.

Cementing attachments are then made and neat cement grout is forced down the 7-in. casing until the calculated quantity, plus a margin, has been put into the hole. The extra cement —the margin—is a matter of judgment and of experience in the field where the work is done. Next, a wooden plunger, fitted with hydraulic leathers, is forced down the 7-in. casing by water pressure, pushing the cement ahead of it, until the plunger reaches the bottom of the casing. This is where the measuring wire is again used to be sure the plunger has been stopped at the right place. This process pushes the cement out between the two casings at the top of the ground.

Valves are closed and the water pres-

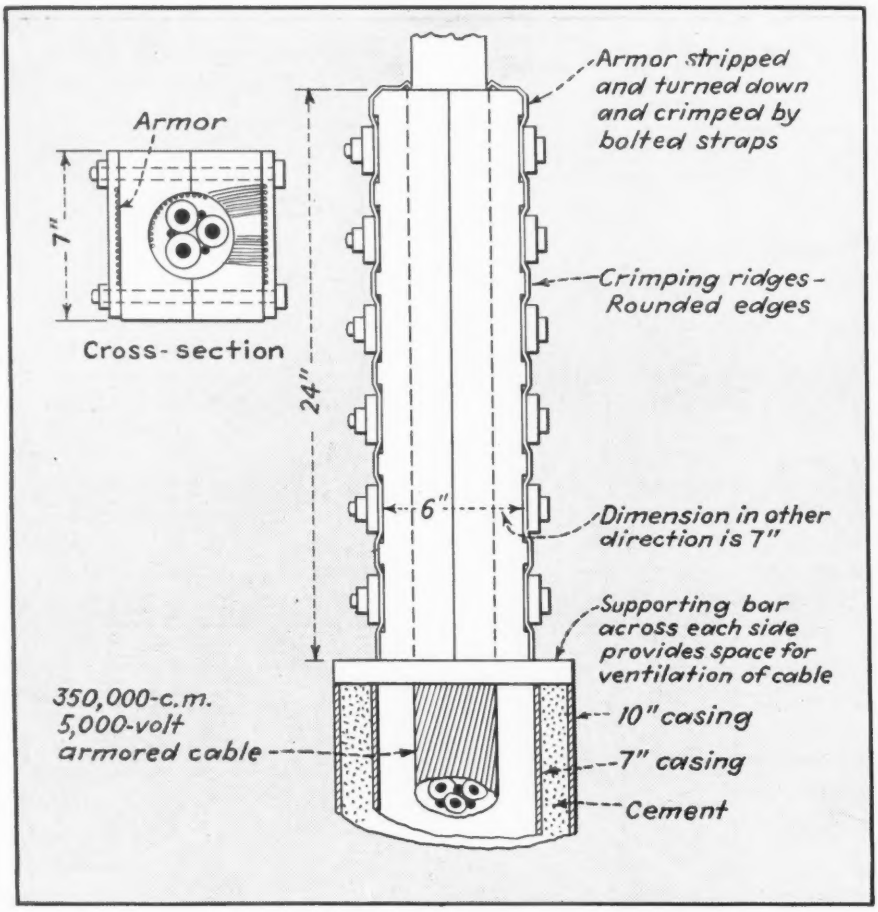


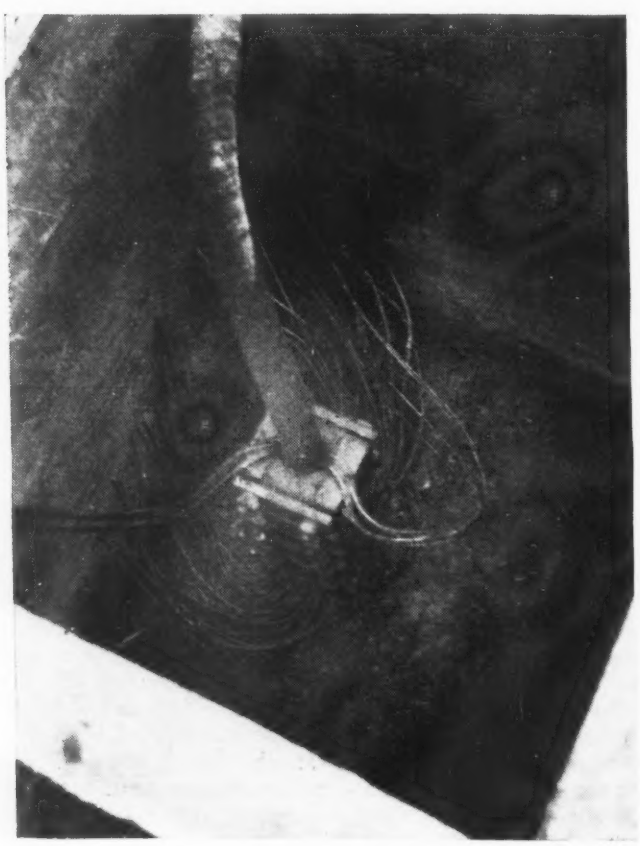
Fig. 2—The cable clamp is made of cast iron and is bored so that there will be a ⅛-in. separation of the two halves, which is closed when the bolts are drawn tight.

sure is retained on the cement for 72 hours for setting. To complete the job the water is bailed out and the plunger, plastic check valve and the cement in the coal at the bottom of the hole are drilled out. It should be noted that the casing was stopped at about the level of the coal roof in the mine. The final touch is mining out the coal from the nearby entry to the bottom of the hole and installing the cable.

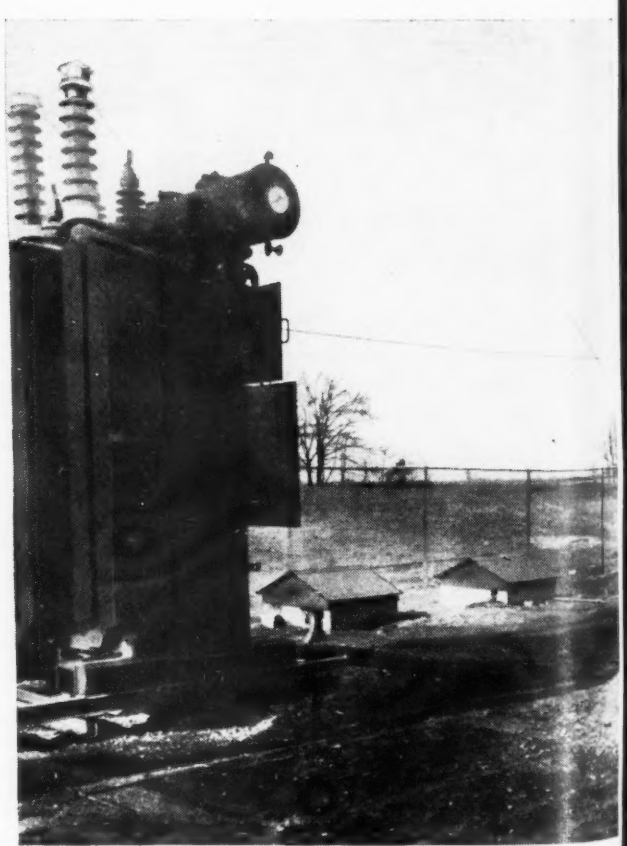
On this job the driller used his rig to pull the cable up the hole from underground. The cable was taken below on its shipping reel and set up under the hole so it could rotate. A steel rope from the drill rig was lowered and fastened to the armor of the cable. These preparations completed, pulling the electric cable up the drillhole was a matter of but eight minutes.

The drillholes for pumping water from the mine have been made by this process. For this service they have the advantage that if the casing rusts through there is a solid, watertight concrete hole that will last the life of the mine.

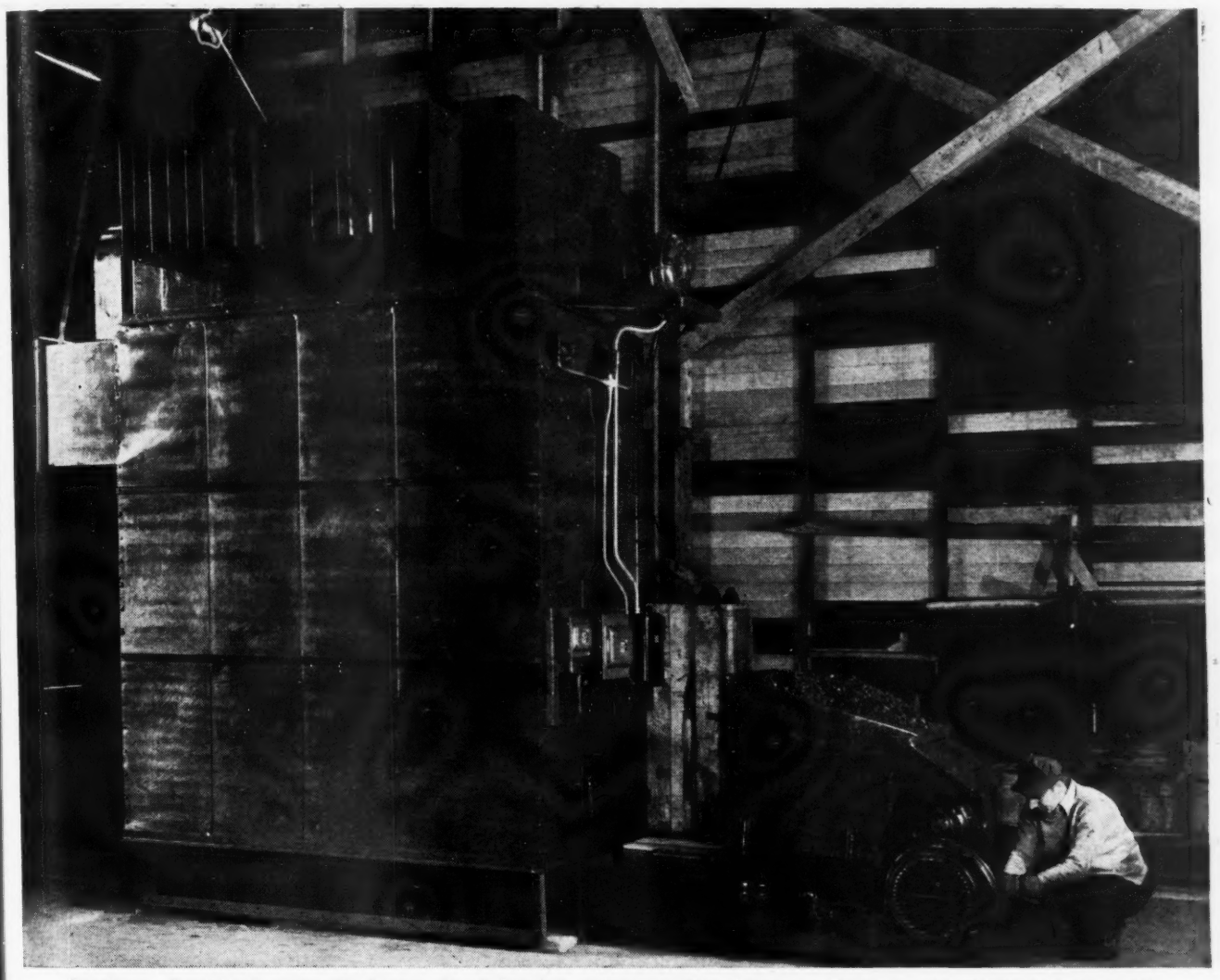
The cementing on these jobs was done by Halliburton Oil Well Cementing Co., with headquarters in Oklahoma and service stations in all the oil fields of the country, including one at West Frankfort, Ill.



Weather-protected concrete borehole pit showing cable clamp.



Power transformer and two boreholes in connection with it.



Specimen direct-fired warm-air heater for industrial and preparation-plant use. Ducts may be attached to the outlet to carry heat to any part of the plant. The heater may be fed by a stoker from a hopper or bin or may be hand-fired.

DIRECT HEATING

For Coal-Mine Preparation Plants

Carrying the Principles of Domestic Installations to Coal-Preparation Plants, Direct-Fired Equipment Provides High Heating Capacity With Simplicity in Design and a Minimum of Attention

By **DAVE HENDERSON**
Sales Engineer, Heater Dept., Dravo Corp.
Pittsburgh, Pa.

THE HEATING system used in a coal preparation plant or tipple necessarily has to be of the simplest. Unskilled labor should be able to take care of it and it should be able to stand up under some neglect. Furthermore, the absence of any susceptibility to freezing up is a distinct operating advantage.

The direct-fired heating system came nearest to meeting these various requirements. The long-established domestic warm-air system with the conventional cast-iron furnace is a direct-fired system. However, its counterpart in the industrial field, while it also takes the heat direct from the coal to the air, is something quite modern and different. It is largely a product

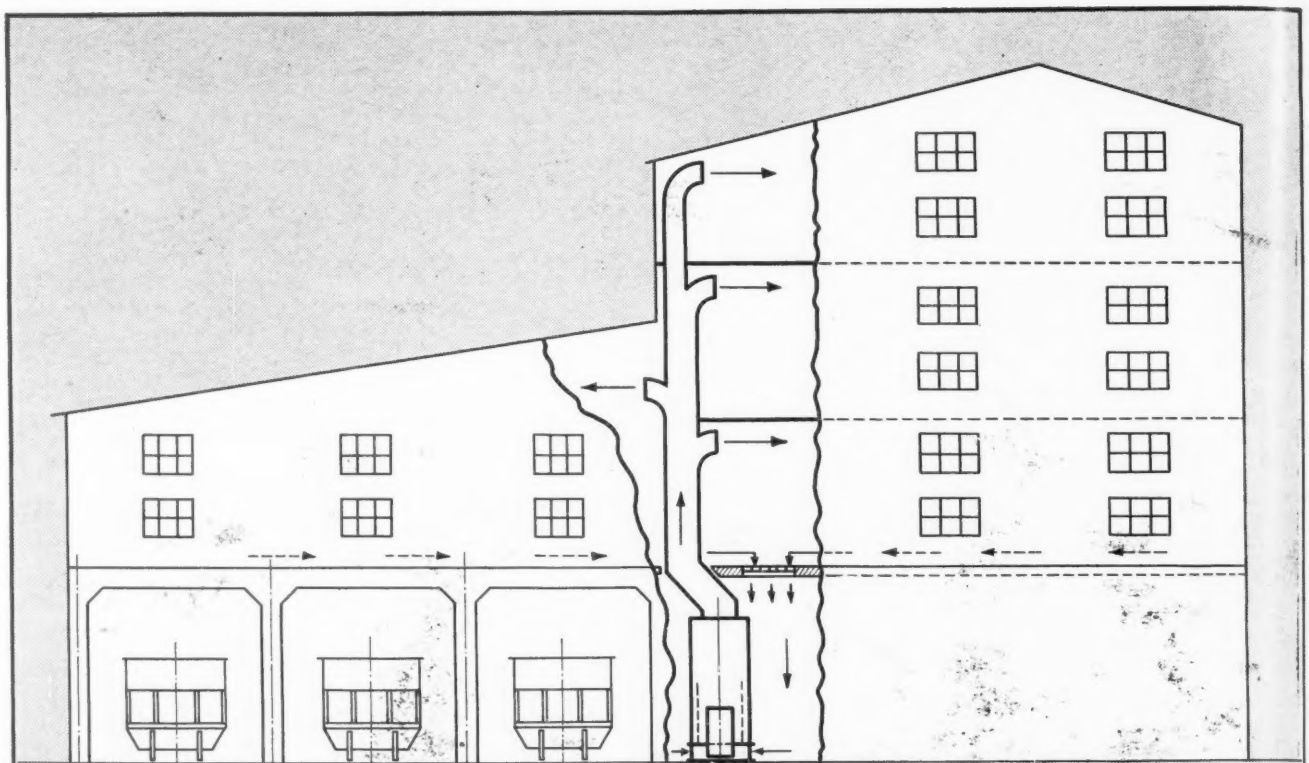


Fig. 1—Example of layout for heating a coal-preparation plant with direct-fired equipment.

of these war times. It met the war requirements of speed, minimum critical materials and minimum cost. As a result, a large number of war plants all over the country have employed direct-fired equipment for their heating requirements. The large demand created has had the effect of so improving the art as to increase materially the scope of such heating. Whereas heretofore this method had a limited application it has now spread to a wide variety of facilities such as steel foundries, airplane plants, airplane hangars, warehouses, machine shops, etc. It is available for heating coal preparation plants and other coal properties.

High Heat Capacity

High heat-generating capacity per unit of surface and volume is the outstanding characteristic of this direct-fired equipment. This has made outputs as high as 8,000,000 B.t.u. per hour. This is equivalent to the output of a 240-hp. boiler and the space required is about the same. The heater is made entirely of steel and in some respects reflects certain design considerations of the modern boiler. The design of the heat transmission surfaces necessarily has to be considerably different, however; all to the end that the amount of heat transmitted per square foot will be comparable when air velocities over the surface are used.

Fig. 1 shows a medium-sized heater of the direct-fired type. The air is picked up at the floor level, where it is coldest, and the warm air is discharged through the three louvered openings near the top, where a motor-driven fan assembly is located to circulate the heated air. This fan assembly includes an induced-draft fan for handling the waste gases. The coal is fed in automatically by means of an underfeed stoker unit, which stoker is provided with the usual forced-draft fan. In other words, the heater operates under both forced and induced draft, resulting in controlled combustion. A heater of this type only 6 ft. wide and 8 ft. in length at the base will deliver enough heat to meet the requirements of the average coal preparation plant.

In most industries this size and type of heater normally is installed without a duct distributing system. Excellent distribution of heat is obtained over unusually wide areas by using suitable outlet velocities. In a coal preparation plant, however, such a method of distribution usually is out of the question since very little open space is available, practically all of the space in such plants being taken up by the machinery and equipment. A warm-air distributing duct is necessary and experience indicates that a simple duct along the lines shown in Fig. 2 will give satisfactory results in the usual coal preparation plant. Most of the air finds its way back to the heater, resulting in practically 100 percent recirculation.

System Is Simple

A characteristic of this method of heating is that there are comparatively few items involved in it. There is a stoker to feed the coal, a heater to heat the air, a motor-driven fan to circulate the air and a warm-air duct system. No water is used and no pressure vessel with the necessary accessories for safe operation is involved. In other words, there is no possibility of an explosion. It will be apparent that while the items involved in this system differ in design, the operating characteristics are practically the same as a modern domestic warm-air system. It is a type of system that even if it operated over a lengthy period without supervision could result in no worse than cold air being delivered instead of warm, due to some routine failure, with no serious damage to be expected. Thus it can stand considerably more neglect.

The non-freezing characteristic is important, particularly for those plants that do not need heat when shut down. A direct-fired system would not have to be kept in operation to prevent it from freezing, with consequent damage to equipment and interruption of operation.

CONCRETE FOR MINES:

Ventilation, Drainage and Building Work*

Flexibility and Low Cost Characterize Concrete for Stoppings and Other Ventilation Work—Grouting Among the Major Drainage Applications—Buildings and Houses Included in the Surface Uses

By ARTHUR E. BELTON
Akron, Ohio

Concrete for surface applications at coal mines includes such examples as the blending bin at the left at this large mechanical cleaning plant.

A VERSATILE material, concrete finds application, in addition to shaft, slope and entry work (*Coal Age*, May, 1944), in ventilation and drainage, as a track support and in a wide variety of surface structures.

Adequate ventilation is as essential to mine operation as is blood circulation to the human body. Uninterrupted ventilation requires that the various units of the air system be built of materials which cannot readily be put out of action by fire or accident. Such structures should be sufficiently tight to prevent leakage of gases into the main incoming air current.

FAN HOUSINGS—The principal advantages of concrete in fan housings are its fire safeness and ability to resist shock until explosion doors can open. In addition it can be built at a cost which compares favorably with less durable construction and once built is free from deterioration and maintenance.

AIRWAYS—Linings for airshafts and airways have been discussed in a preceding section (May, 1944, *Coal Age*). It may be well, however, to stress the importance of providing strong, fireproof linings of low frictional resistance in all main airways, both as a matter of safety and low operating costs.

OVERCASTS—Concrete is quite frequently used in building permanent overcasts or undercasts. Two general types are described in the following: In the first, the bridge, or floor, of the aircourse is built of steel beams from rib to rib, completely incased in concrete to a depth of at least 2 in. In the other, the bridge is built of reinforced concrete either in the form of an arch or a flat slab.

Bulkheads and walls may be built of reinforced concrete 8 to 12 in. thick or of concrete block covered with about ¾ in. of cement plaster on the intake side. Walls should be set in hitches cut in the bottom and rib. In soft ground they should be supported on spread footings. Joints at the tops of walls may be caulked with tarred oakum or pointed up with fairly dry cement mortar.

The thickness and reinforcement of the floor slab will depend upon the span and loads to be carried.

STOPPINGS—Stoppings may be a source of considerable expense or the contrary, depending upon the way they are built and the materials used in construction.

The major requirements of a successful stopping are airtightness, fire safeness, strength to resist slight movement in the surrounding materials or air pressure due to windy or blown-out shots, low initial cost and freedom from maintenance. In addition, they must be readily and quickly built by the mine forces.

Concrete stoppings may be built to any desired thickness, either reinforced or plain, depending upon conditions of use. Ordinarily they are about 6 in. thick and without reinforcement. In the best type of construction, the ends and bottom are hitched in the surrounding materials and the top is tightly caulked. Where a bad roof is encountered, walls sometimes are built about 10 to 15 ft. apart, the intervening space being packed with gob, refuse or old timber. Spaces left by rock falls are patched as needed with additional concrete.

Forms for concrete stoppings are easily constructed by wedging 4x4 props between the roof and bottom and facing them with odds and ends of boards. In seams much over 6 ft. thick, bracing may be required midhigh of the props to prevent deflection due to concrete pressure.

A concrete mixture of about one part cement, two parts of sand and four parts of crushed stone or gravel is desirable for airtight work. Mixtures of cement, sand and cinders or slag also are effective, especially if the

*Last in a series of articles on concrete work based on 1943 thesis (see *Coal Age*, March, 1944, p. 90). Special acknowledgment is made of sources as follows: "Concrete," "Concrete Masonry Construction," "Concrete Lining for Mine Shafts" and other publications of the Portland Cement Association.

face of the stopping is plastered with a 1:3 cement-sand plaster.

Where a good supply of concrete block or tile is available, it is often found to be more economical to build stoppings of these materials. Cinder concrete blocks make an exceptional backing for cement plaster and have sufficient strength for most stopping purposes. Some mines find it economical to install a small block machine and utilize their waste cinders or a nearby sand supply in making block for stoppings and the other purposes.

Under ordinary conditions it will be found that concrete or concrete block stoppings are the most economical type that can be built.

Table I compares the cost of the more common stopping materials, figured over a term of 15 years.

Mine Drainage

One of the important phases of mine construction and one which, if improperly handled, may be the cause of accidents and serious delays to production is the collection and disposal of underground water. Mine waters frequently contain considerable acid or alkaline matter as well as mineral grit. The problem of disposal, therefore, is not alone one of economical design but also of selection of materials which will resist chemical attack and abrasion.

PIPE PROTECTION — Where pipelines are used they may be protected from external corrosion by a coating of portland cement mortar or gunite. In the smaller sizes it generally is sufficient to embed the pipe in a casing of 1:2 mortar or to sandblast with a cement gun and shoot on a coat of gunite without reinforcement. Pipe 4 in. in diameter, however, should be wrapped with chicken netting or wire mesh before the coating is applied. Unions should be left in long runs at frequent intervals to facilitate repairs and the covering should be broken at these points; also at intervals of 40 or 50 ft. in coupled pipe and at each joint in flanged pipe. Coatings of this character, to be entirely effective, should be inspected frequently and repaired where they may have been damaged from rock falls or accident.

In addition to external protection, linings which will prevent corrosion are frequently necessary. Pipe lined with neat cement or very rich cement mixtures will offer high resistance to oxidation and ordinary chemical attack. Such linings will protect the metal from deterioration for an indefinite period. These linings are not effective, however, where acidity is high or under conditions of excessive abrasion. Special fittings are required.

SUMPS—In primary or secondary sumps the ribs, floors and roofs should be lined with concrete wherever there is a possibility that the surrounding rock will be affected by air and moisture. Such linings prevent leakage of water back into the workings, as well as falls of rock which reduce sump capacity and possibly damage pumps by getting into the suction. A concrete bottom facilitates cleaning a sump should it become partly silted.

An effective construction is one in which the main pumproom is located directly over the sump, since this reduces the length of pipe. In a structure of this character the pump and machinery foundations are carried down to the bottom of the sump. A reinforced-concrete slab roof over the sump acts as the floor of the pumproom. Manholes through the floor provide access for cleaning.

OPEN-TOP SUMPS — Open-top sumps sometimes are lined with a reinforced coating of gunite, built up to a minimum thickness of 2 in. over the rock, the thickness being checked by temporary screens placed to a proper face alignment before starting operations. Concrete linings 4 to 12 in. thick are equally effective and frequently more economical. Reinforcement equivalent to ½-in. square bars on 2-ft. centers horizontally and vertically will tend to overcome cracking due to shrinkage when the sump is dry, and will resist slight swelling effects due to minor leakage.* A mix of approximately one part of cement, two parts of sand and three parts of coarse aggregate is recommended.

If the sump walls act as a support for the pumproom floor a lining thickness of 8 to 12 in. usually is required. A 12-in. division wall across the sump will permit half to be used during cleaning operations in the other half. Such a wall should be built into deep hitches in the rib and reinforced to sustain unbalanced load when one compartment is full and the other empty. In deep sumps of small area such walls usually are not practicable.

PUMPROOMS — Pumprooms located at the side of the shaft should be separated therefrom by a concrete wall to prevent falling coal from damaging the equipment. Linings for such rooms may be of concrete, gunite or plaster. Where the roof breaks high a concrete arch section normally is economical, while for low, flat roofs steel beams carrying a reinforced-concrete slab is a common practice. The space over the arch or slab should be packed tight with rock.

DITCHES—Shallow ditches ordinarily do not require lining, but in fireclays or other bad ground linings minimize or prevent entirely roof and track subsidence by providing protection to the rib and bottom rock. Linings also facilitate cleaning. A 2-in. coating of gunite or 4 to 6 in. of plain concrete usually will provide an effective ditch lining, except where squeezing or shifting of ground occurs. Such linings should be inspected frequently and repaired immediately when necessary. Small concrete dams at inter-

* March, C. F., and Dun, William. *Reinforced Concrete.*

Table I—Summary of Erection and Maintenance Costs of Stoppings Reduced to the Annual Expense Necessary for a Period of 15 Years

Kind of Stopping	Annual Expense for 15 Years — First Cost	Maintenance	Renewals	Emergency Repairs	Total
Board, rough lumber	$0.31	$0.82	$1.24	$0.13	$2.50
Board, tongue and groove	.36	.32	1.02	.15	1.85
Board, planed on two sides and painted	.40	.52	.80	.17	1.89
Brick, 4 in. thick	.44	.26	.44	.07	1.21
Brick, 5 in. thick	.74	.19	....	.03	.96
Concrete monolith, 8 in. thick	.49	.19	....	.02	.70
Concrete block, block 8 x 10 x 16 in.	.44	.19	....	.02	.65
Slate or gob, in dry wall	.31	1.28	....	.01	1.60
Slate or gob, dry wall, faced with cement	.43	.89	....	.02	1.34

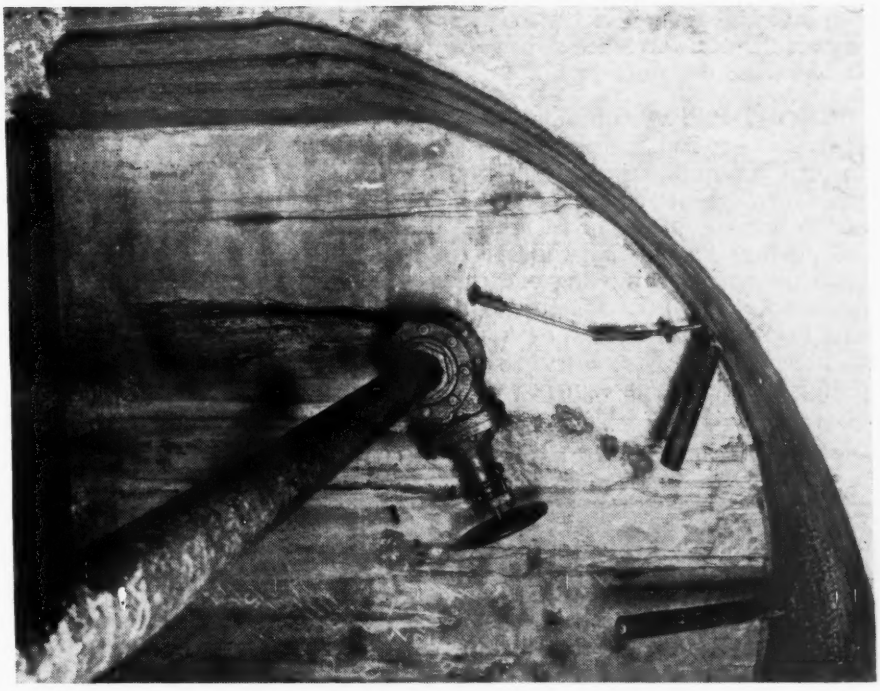
Bulletin 99, U. S. Bureau of Mines

vals of 200 or 300 ft., with crests far enough below the bottom of the entry to provide for flood flow, will catch grit and refuse which would otherwise go into the sumps.

Deep ditches normally should have a lining of reinforced concrete with struts between the walls at intervals to reduce the quantity of concrete required for stability. The struts also act as supports for ditch covers—a safety measure with foot or animal traffic. Both struts and covers may be of reinforced concrete if desired, or the ditch may be covered with a reinforced slab with a removable section left at intervals for cleaning purposes. In the first instance cover sections of precast type probably would be most economical, while in the second the entire ditch section would be cast in place like a box culvert.

Where very high flows occur it is feasible to utilize the entire width of an entry for drainage purposes by building a concrete bottom and rib section with pier and girder supports for trackage and manways.

Structures used for mine drainage should be built with exceptional care to obtain a dense, impermeable concrete, since only material of this character is highly resistant to dilute acid attack and abrasion. Any reinforcement of embedded metal should be covered by a minimum of 2 in. of concrete.



Stoppings and bulkheads in mines lend themselves to concrete construction. Grouting supplemented concrete for resistance to high heads in this particular example.

Grouting

Water encountered during shaft sinking or driving entries, slopes and other openings often presents a difficult problem. Not the least is the virtual impossibility of determining well in advance of excavation the pressure and flow that may be expected.

It is not always possible to seal off completely the flow of underground waters in a mine. Moreover, a small flow often will be useful in minimizing the danger of dust explosions. It usually is advisable, however, to reduce the flow to proportions providing comfortable working conditions and preventing damage to structures and equipment in the event of an accident to the pumps.

Pressure grouting is the most effective means of sealing off excessive flows of water, but it must be realized that successful and economical grouting depends upon intelligent handling of each particular problem, and the work usually should be undertaken only by experienced men.

While the term "grouting" may have a number of meanings, in tunnel or mine operations it designates a process of forcing cement paste or cement-sand mixtures into voids or water-bearing seams. Pressures may be developed by pneumatic or hydraulic means. Sometimes it is desirable to use both where water heads are high.

GROUTING MIXTURES—Neat cement paste ordinarily is used for grouting fine fissures or highly faulted rock, while cement-sand mixtures are adaptable to plugging large seams or faults. Cavities or badly broken ground sometimes are temporarily stopped with soft wood sawdust, beans or oats, final grouting being done with cement.

Rock under certain conditions acts as a filter against grout pressures and will not accept enough cement for an effective seal. Under such conditions it often is possible to force solutions of sodium silicate and aluminum sulphate into alternate pipes. The gelatinous precipitate which occurs when these solutions combine acts as a seal to prevent filtration. Asphaltic compounds sometimes are used similarly, although fumes may be objectionable.

GROUTING METHODS—Two general methods of grouting are used in tunnel and mine work. In the first, grout is forced through deep-seated pipes in the natural rock face before the general excavation has reached the water-bearing ground. In the second, water temporarily is drained away through bleeder pipes until a reinforced-concrete lining can be placed, after which grouting is carried on through the bleeders or through special pipes left for the purpose.

The first method is not particularly effective in loose stratified rock or where high grout pressures are required, since the great pressure may force out sections of the rock and nullify the work. It is effective, however, where the thickness of rock over the discharge ends of pipes is sufficient to hold the pressures.

The second method is effective against all heads commonly encountered in mine work, provided the concrete lining or bulkhead is designed to resist the pressures and the grouting is carried on in successive stages until all seams are sealed. A cylindrical lining is capable of resisting very high pressures and should be used where they may be expected.

CONCRETE BULKHEADS—In constructing a reinforced-concrete lining or bulkhead through water-bearing zones, fine seams may be caulked with lead wire and pipes seated at varying depths driven into drillholes in the rock before the forms are built. Water running down the face of the rock should be collected in pans nailed into wood plugs. Pans are sealed with oakum and portland cement and drain pipes are provided at low points to

carry away the water until the concrete is placed and has hardened sufficiently to withstand the grout pressures.

GROUT PIPES—Grout pipes generally are 1½ to 2 in. in diameter. Near the ends driven into the drillholes the pipes are roughened and wrapped with cotton wicking, burlap or oakum before driving. Pipe spacing will depend upon the nature of the flow and the condition of the rock. It is better to have too many than too few, especially in heavy flows. Pipes are threaded on the outer ends and equipped with quick-acting valves.

GROUTING PRESSURES—High grouting pressures should be avoided except where they can do no damage or where low pressures are ineffective. Ordinarily pressures from 35 to 500 lb. per square inch will be ample, but pressures as high as 1,000 lb. have been required on some operations. By varying the water content of the grout and by preliminary grouting with various mixtures, it often is possible to avoid high pressures. The best initial pressure usually can be determined by closing the ends of the grout pipes and reading the pressures on a gage on one of the pipes.

CONSISTENCY OF GROUT—Proper consistencies and mixtures of grout can be determined only by trial. It normally is best to use the thickest consistency that will readily flow in the hole since less grout is wasted and the cement attains a higher strength.

Sand, when it can be used at all in grout, should be relatively fine. It should all pass a ⅛-in.-mesh sieve and at least 50 percent should pass a 50-mesh sieve. Sand should be thoroughly mixed with cement before it is introduced into the grout machine as it then has less tendency to separate and form strata or strings which will not hold back water.

Just prior to grouting in rock that contains mud seams or sand fissures, it is best to force in water under high pressure to provide as much space as possible for the grout which follows. Large sand pockets can sometimes be grouted successfully, but as a general rule it is best to seal off such areas with an impervious bulkhead of concrete.

In existing shafts in which the lining is not impervious it sometimes is possible to remedy the condition by grouting through the lining or through drillholes from the surface just outside the lining. Unless the lining has been designed to resist grout pressures, it may be necessary to provide pads or other temporary supports to prevent cracking or damage.

Track Supports

In the average coal mine, especially where motor equipment and heavy rolling stock are used, track maintenance constitutes a serious item of expense.

It is not always practicable to build the original trackage on concrete, but such a step is desirable whenever possible from the standpoint of economy and efficiency of operation in all permanent haulageways and main-line work.

GIRDER TYPE—With firm bottom conditions a girder-type track support probably is the logical choice. This support consists of a reinforced-concrete beam under each rail, about 18 in. wide and 10 to 12 in. in depth. The reinforcement may be strips of wire mesh, steel bars, or short lengths of old wire rope.

The track is first laid to the proper alignment and graded and supported on concrete blocks or short pieces of old mine timber. The proper gage is maintained by sections of old rail welded to the flanges or webs of the track rails at about 6-ft. intervals.

The concrete is placed either between wood forms or in a trench previously cut into the bottom. On the outside of the rails the concrete is carried up approximately level with the top while on the gage side it may be stopped at the bottom edge of the tee head. Where water is present, the concrete should be slightly pitched away from the rail on both sides to provide quick drainage.

MAT TYPE—In soft or marshy bottoms, which also may be subject to heaving, the mat type of track support offers a singularly effective means of reducing operating and maintenance costs. Bottoms of this character usually may be protected from softening by concrete slabs 8 to 10 in. thick running from rib to rib. Such slabs normally are reinforced to better resist unequal loading. On double track lines the slab may be constructed under one track at a time, using the other track to carry traffic. The concreting plant and material cars can be carried on the idle track and hauled back away from the fresh concrete as the work progresses.

Wood ties or spiking blocks should not be left in place unless they are completely encased in the concrete. This requires a greater depth of concrete than is necessary where the rail alone is embedded.

Surface Structures

The use of concrete for surface structures at coal mines and in mining communities, while not so general as in structures below ground, nevertheless has been quite extensive. An enumeration of the various surface facilities that have been built of concrete would cover every type of structure required for mining communities. Where they have been properly built they have met every requirement of an economic or statutory nature and, in durability and freedom from repairs and maintenance, have matched the performance of the best concrete work inside the mine.

The engineering and architectural problems involved in building surface structures at mines are as diversified as the structures themselves. They differ little, however, from problems encountered in constructing similar facilities in other lines of industry. As such, these problems are well presented and discussed in existing publications.

A possible exception to this rule is in the use of concrete for headframes and tipples. Here individual peculiarities of stress sometimes introduce problems for which there apparently is no stereotyped solution in engineering precedent. That this fact has proved to be no obstacle to mining engineers, however, is attested by many very excellent examples of structures of this character giving complete satisfaction at various mines.

TIPPLES—Where the tipple is built of structural steel it is becoming common practice to carry three sides of the concrete shaft curbing up to the dumping point to protect the steel from shaft gases and minimize vibration. Where the structural design permits, it also is possible to reduce maintenance charges by protecting the legs, stiffeners and batter braces with concrete or gunite, care being taken first to remove loose scale, paint and grease. Wire-mesh reinforcement wrapped around the steel members distributes vibrational stresses in this

concrete and reduces the possibility of formation of cracks.

BUILDINGS AND OTHER FACILITIES—Fire safety, durability and low initial cost are the usual controlling factors in the selection of concrete for the construction of hoist, boiler, power, fan, lamp, oil and wash- and change-houses. Here again the permanence of the buildings and the general sense of stability and good appearance afforded by concrete or stucco construction warrant the selection of this material for the work. The additional incentive of lowest insurance rates should be considered. Such buildings may be built of reinforced concrete, concrete block or tile, using a stucco surfacing to obtain pleasing architectural effects. Sanitary and recreational buildings and facilities also lend themselves to concrete construction.

In the matter of housing, good homes go far toward assuring contented miners. With this theory as a basis, one of the large coal-mining companies of West Virginia has adopted a progressive program for the rehabilitation of miners' homes. New foundations are built and the exteriors of old frame houses are covered with a white portland cement stucco.

Portland cement stucco reduces the fire hazard and prevents the communication of flames to adjacent buildings. Clean white stucco homes enhance the appearance of the community, thus adding greatly to the pride and morale of those who must live in the mine areas.

The mixture to be used on all portland cement stucco is one part of cement to three parts of sand. To this mix, 10 percent of lime per bag of cement may be added to increase workability.

Concrete Products

In addition to the major uses of cement and concrete which have been described, a number of products made from cement and aggregates offer definite possibilities of economy and service around mining developments. These include concrete pipe, which is manufactured on a commercial scale within economical shipping distance of most coal mines. Pipe of this character is available in sizes ranging from 6 to 108 in. in diameter for both ordinary and pressure purposes. Reinforced-concrete pipe has the ability to withstand heavy earth pressure without failure. It is less subject to electrolysis than metal pipe. The hydraulic capacity of a concrete pipe is never reduced by aqueous growths or tuberculation. For culvert purposes, concrete pipe is an accepted standard in highway specifications and for railroad work.

Roof coverings and sheathing materials of cement and concrete are made in several varieties and are in common use. These include a number of types of concrete roofing tiles, precast roof-slab units and cement-asbestos shingles and wall siding. The great advantages of these materials are their fire resistance, non-inflammability, freedom from maintenance charges and resistance to corrosion or fumes. The cement-asbestos siding materials make an excellent covering for tipples, screen houses and similar frame structures. They will resist weather without painting.

Several types of precast concrete cribbing for retaining fill and spoil banks are made on a commercial scale. This type of material is used to a large extent by railroads and municipalities where economy in cost or speed requirements give the precast type an advantage.

Where it is necessary to retain the edges of a mine dump to protect buildings and trackage, precast cribbing offers an economical means of support, since it will not burn or decay, as will old mine timbering often used for the purpose. There is a very high salvage in this material in case the dump area is enlarged or shifted.

Mine superintendents who have used concrete block, brick and tile in the building of various structures above and below ground ordinarily find that these units offer very definite possibilities for economy in first and subsequent cost. This is especially true in mines where plants for the making of cast-in-place concrete are not available or where materials for building purposes must be shipped in from considerable distances.

Units of this character are produced commercially in practically every community or may be had within moderate haulage distance of the mine. When a local supply is not available, or when there is a nearby sand pit containing materials suitable for aggregate purposes, it frequently is found to be a matter of economy to install equipment at the mine mouth or below ground for the manufacture of the particular types of units desired. Ordinary labor is used in operating such equipment and one or two men working either full or part time generally can keep ahead of the mine requirements.

Concrete brick machines ordinarily turn out a product of the same size as other varieties of common brick while block machines make a product 8, 10 or 12 in. in thickness, 8 in. in height and 16 in. in length. Concrete tile will range in thickness from 4 to 12 in. and generally will be of somewhat smaller surface area than blocks.

In resisting fire, concrete building units are second only to cast-in-place concrete. The strength of such units is dependent to a great extent upon the proportions of materials used in the mixture, the size of the aggregates, methods of curing and age of product. Ordinarily, however, the strength is sufficient at an age of 28 days to meet all requirements of use in mine structures to which masonry is adaptable. Good concrete units also have very low absorptive value and for this reason may be used with entire safety in walls which must keep out moisture.

Walls or piers of concrete masonry laid up in cement mortar are as a rule the strongest type of unit construction. The mortar itself, being a form of concrete, adheres most tenaciously to materials of a similar nature, thus producing the best possible bond between units.

Where exceptional strength or watertightness of joint is desired, a mortar consistency of one part portland cement, three parts of well-graded sand and 20 percent of hydrated lime, or its equivalent in lime putty by weight of cement, is recommended. For general purposes, however, a mix of one part cement, one of lime and six of sand by volume is sufficient.

In addition to use in the building of stoppings and overcasts, products of this character are widely used in the construction of wash- and change-houses, oil houses, shops, dwellings and similar structures. Such buildings may be built of plain units without any further exterior treatment or may be given a stucco surfacing. In warm climates interior plaster may be applied directly to the surface of the block, but in cooler areas interior plastering should be furred out to avoid the possibility of condensation.

Concrete masonry units should be cured for at least 28 days and permitted to dry thoroughly before use in important structures, especially in long walls or bearing members. Just prior to laying the units should be slightly dampened on the mortar beds but not saturated.

WAR PRODUCTION

Keynote of Cincinnati Meeting

PRODUCTION for war held the spotlight at the 1944 Coal-Mine War Conference of the American Mining Congress, Netherland-Plaza Hotel, Cincinnati, Ohio, May 1-2. Mechanical mining and stripping, face and overburden preparation, haulage, power, ventilation, drainage, maintenance, safety and preparation were starred in the several technical sessions, along with conservation to help meet the problem of matching supply to demand. And with an eye to the future, post-war planning in mine operation, finances and ability to meet competition occupied a prominent spot in the program.

Coal's Job Today—and Tomorrow

WHAT coal must do now to meet war demands and what it should be thinking about in preparing for the future were highlights of the 1943 War Conference. Forecasting a possible shortage of 20,000,000 tons this year, Dr. Charles J. Potter, Deputy Solid Fuels Administrator, Washington, D. C., urged the industry to take all possible steps to increase output and to cooperate in conservation programs and in carrying out distribution orders. "If," said Dr. Potter, "we could maintain our present labor force and get through the year without work stoppages, I should have little fear of our ability to produce 620,000,000 tons. But we're confronted with two very real problems. First is the problem of additional manpower losses and second is the problem of full utilization of available manpower."

Commending the industry for achievement already made, Dr. Potter advanced a six-point program to increase output to meet wartime needs:

"1. Improving the relationship between management and labor for the purpose of reducing the tonnage lost by work stoppages and voluntary absenteeism." There is no better way of "securing the output of 4,000 new coal miners than by avoiding work stoppages.

"2. Maintenance of the best possible safety standards.

"3. More vigorous action to obtain the deferment of vital key men from induction into the armed forces.

"4. More emphasis on the recruiting and training of new men.

"5. Mechanization within the limits possible in view of the present shortage of machinery and materials.

"6. Better management and more efficient utilization of the available manpower and equipment.

Underwood & Underwood

Dr. C. J. Potter, Deputy Solid Fuels Administrator for War.

"It is our determination," Dr. Potter concluded, "to win this battle of coal in the winter of 1944-45 and to win it in such a way as to be of permanent satisfaction and benefit to the entire coal industry of the United States."

Increased coal production now will not only result in a valuable contribution to winning the war but will enhance the prestige of the industry in the future, declared Donald M. Nelson, chairman of the War Production Board, at the annual Congress dinner. Declaring his belief that home-front morale is high, Mr. Nelson commented also that "your own industry, the coal-mining industry, has been the target of much loose talk about morale. I think the best refutation of these attacks, the clearest proof of the earnest desire of the coal industry to do its full share toward winning the war, is its record of production. You have done a job of which any industry might well be proud, especially in view of the many difficulties encountered along the way."

Paying tribute to A. S. Knoizen and the staff of the Mining Division of WPB, Mr. Nelson declared that coal faces the task of producing even more in the future than in the past. The final test is individual effort at the mines. "Nobody hopes for a big sudden jump in coal production. What we do hope for is a steady, inching progress—a little here and a little there—not by any single idea or action but by a concerted, all-round attack on the problem." One point of attack, said Mr. Nelson, is absenteeism and a good way of handling it and otherwise encouraging greater output is increased adoption of the idea of joint labor-management committees. Conservation is another angle of attack. "The coal industry cannot do too much to aid the government in bringing home to the American people their responsibility for helping, in this invasion year, by using just the amount of coal they need and no more. Once the American people understand the necessity for coal conservation, it will not be difficult to get them to cooperate.

"Every possible action to maintain and step up the output of your mines needs to be taken without delay. You can be sure that the War Production Board, and I personally, will be glad to do everything in our power to aid you."

Rigid economy in the use of fuel is the only possible remaining chance of narrowing the gap between production and consumption of coal this

coming winter, declared Henry F. Hebley, director of research, Pittsburgh Coal Co., Pittsburgh, Pa., in a discussion of conservation possibilities. Coal, Mr. Hebley pointed out, has been called upon to supply increasing demands because of the war and shortage of other fuels, and has at the same time suffered losses in producing ability through actual loss of men and the increasing age of men still available.

Waste a Job for All

The producer, the distributor and the consumer have a part to play in reducing waste of coal. Greatest savings can be made by commercial and industrial users. In space heating, four sources of waste should be checked: poor combustion, poor absorption, radiation loss in transmission pipes and poor emission of heat. Stocking coal now was urged by Mr. Hebley because "it is essential that all mines be kept in active production throughout the year."

A saving of 8,600,000 tons annually could be achieved if domestic and small industrial efficiency were increased, declared S. W. Guthrie, research engineer, Rochester & Pittsburgh Coal Co., Indiana, Pa. He placed domestic efficiency at 41 to 55 percent and small industrial efficiency at 54 to 60 percent.

Coals formerly considered unfit for stockpiling may now be stored by following proper methods, said E. R. Kaiser, Battelle Memorial Institute, Columbus, Ohio. These involve laying industrial slack down in layers 2 or 3 ft. thick and then compacting them with a bulldozer to keep air out and lessen the danger of spontaneous combustion.

The Bureau of Mines fuel efficiency program was outlined by Thomas C. Cheasley, Sinclair Coal Co., Kansas City, Mo., and supervising engineer for the "National Fuel Efficiency Program." This program, declared Mr. Cheasley, is "not just another government project but is based on personal contact with the user in his plant."

Bituminous coal's part in World Wars I and II was compared by George E. Stringfellow, vice president, Thomas A. Edison, Inc., West Orange, N. J., who brought out that the industry in the present conflict has produced as much or more with fewer men and in a shorter time than it did in World War I.

The fact that coal's first job is to produce for war also was reiterated by D. L. McElroy, chief engineer, Consolidation Coal Co., Fairmont, W. Va., in opening the discussion of planning for the future—the first order of business at the conference. In introducing Mr. McElroy and various conference officials, Hubert E. Howard, president, Binkley Coal Co., Chicago, made the point that coal so far has fulfilled its obligations to government and country. But the task ahead is even more difficult. Each problem, he declared, will increase in difficulty as the square of the time. Coal is the single most vital material in war, observed Charles Dorrance, president, West Virginia Coal & Coke Corp., Cincinnati, Ohio, and national program chairman, while Harry M. Moses, president, H. C. Frick Coke Co., Pittsburgh, Pa., and chairman of the A.M.C. Coal Division, said that despite difficulties coal will come nearer this year's production goals than many, including some government officials, expect.

There is no cure-all or sure-fire line of attack in future planning, said Mr. McElroy, but nevertheless coal will fail in its responsibilities if it fails to take every possible step to prepare for things to come. The best program for coal is to be there too soon with too much rather than too late with too little. Planning should take in everything from the face to the customer, taking in (1) markets, (2) mines, (3) manpower and (4) money.

In considering markets Mr. McElroy suggested planning for postwar sales on a conservative basis. Competition will require careful watching, as pipelines and the possibility of substantial increases in oil imports may favor rival fuels. New uses for coal should be sought out and encouraged. Some hold immediate promise and others are farther in the future. Coal still is primarily a fuel, and it is best to concentrate more on markets yielding maximum returns.

Producing facilities, in Mr. McElroy's opinion, are perhaps the most important consideration in postwar planning. Every effort must be made to search out the properties with good postwar prospects and get them in the best possible shape for maximum efficiency and low cost.

Manpower developments will be characterized by rate increases in the future and an opportunity to choose mine staffs from the pick of the crop, although some ex-service men will have to make a major readjustment and that may take time. Increased mechanical mining in the future will tend to reduce the number of men, but it should not be forgotten that this may be offset partly or wholly by increased unemployment compensation, separation wages and legal restrictions on layoffs. Labor legislation and regulations, in fact, must be constantly watched. Unrest and a drive for further substantial concessions may follow the war, but unionization will continue and coal will become increasingly an industry of skilled labor. With this labor as a base and proper planning, however, the postwar prospect should be good.

After the war, said Mr. McElroy, the premium will be on plants in a liquid condition. If possible, coal must try to foresee whether inflation or deflation is in prospect and plan accordingly. Obsolete equipment must

Officials and session chairmen in charge of the conduct of the 1944 Coal-Mine War Conference included the following:

Howard I. Young, president, American Mining Congress and the American Zinc, Lead & Smelting Co.

Julian D. Conover, secretary, American Mining Congress.

Charles Dorrance, national chairman, program committee, and president, West Virginia Coal & Coke Corp.

Harry M. Moses, chairman, Coal Division, and president, H. C. Frick Coke Co.

George E. Stringfellow, retiring chairman, Manufacturers' Division, and vice president, Thomas A. Edison, Inc.

H. V. Brown, new chairman, Manufacturers' Division, and general manager, the Brown-Fayro Co.

Hubert E. Howard, president, Pyramid Coal Corp.

L. C. Campbell, vice president, Koppers Coal Division.

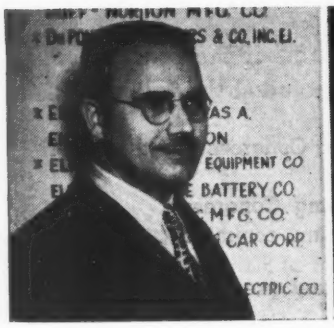
James Hyslop, vice president, Hanna Coal Co.

C. A. Gibbons, general manager, Susquehanna Collieries Co.

A. K. Hert, general manager, Snow Hill Coal Corp.

George L. Smith, vice president, Rochester & Pittsburgh Coal Co.

R. H. Sherwood, president, Central Indiana Coal Co.



P. R. Paulick, consulting mechanization engineer.

W. D. Cohelia, safety director, High Splint Coal Co.

Martin Heckard, truck foreman, Midland Electric Coal Corp.

Howard Asbell, truck superintendent, Sinclair Coal Co.

G. Stuart Jenkins, assistant general manager, Consolidated Coal Co.

H. F. Hebley, director of research, Pittsburgh Coal Co.

Lafe Stewart, chief engineer, Maumee Collieries Co.

H. V. Brown, general manager, Brown-Fayro Co.—new chairman, Manufacturers' Division.

go. Management is the vital factor and must accept its responsibilities for the future of the business.

Oil competition may be expected to increase in the future and coal must plan accordingly, declared Joseph Pursglove Jr., president, Pursglove Coal Mining Co., Morgantown, W. Va., in opening the discussion. In transportation, for example, oil should come out in a relatively advantageous position, while coal must continue to move in railroad cars and freights show an alarming tendency to increase. The question of a new form of transportation should be thoroughly studied. Diesel locomotives are rapidly increasing and coal apparently stands to lose a substantial additional chunk of the railroad market. In manpower, care should be exercised in selection of men for the future. Mechanical mining will never reach its peak until a machine is perfected that will do everything, including setting the timbers.

In contrast with World War I, said Robert M. Weidenhamer, assistant chief, metals and minerals unit, Bureau of Foreign and Domestic Commerce, Washington, D. C., coal companies are reducing or paying off debts. But such companies should always keep in mind that "two liabilities, not visible in the balance sheet, have mushroomed. These invisible liabilities are: (1) the accumulation of deferred expenditures for equipment; (2) the approach of the time when new mines may have to be opened because the presently operated ones are nearing exhaustion." Operating men must do their part in keeping financial and accounting officials conscious of these liabilities, and the best way is to "present a careful budget of the postwar cash needs that will arise when deferred capital expenditures" finally will have to be made up.

Estimates of these capital expenditures, said Mr. Weidenhamer, are entirely dependent on the outlook for coal production. In this respect favorable factors include the possibility of substantial coal exports, the possibility of an increase in fuel oil prices, although it may not be felt for some years, and achievement of high level of employment and production. "Nothing is more dangerous than optimistic complacency, but if the coal industry is to assume its share of a high level of peacetime production a 600,000,000-ton output should be the basis for planning a deferred capital-expenditure budget."

Research is vital if coal is to regain its place at the top of the fuel league, declared Charles B. Baton, consulting engineer, Pittsburgh, Pa., in opening the discussion on the research phase of the conference's postwar program. Coal now loses all too often to the other teams—oil, natural gas and hydro power—although none of the three can take credit for doing a better job of supplying the country's energy requirements. Coal's war record is unsurpassed, but what of the future? Oil and gas certainly will offer keen competition, with hydro still a power to be reckoned with.

While the other teams at present possess certain advantages, including absence of smoke and ash, plus government backing in the case of hydro, coal still is the cheapest on a B.t.u. basis. If this were the only factor, coal would have no competition. The supply is plentiful and with these advantages coal can face the future confidently if it takes the proper steps. Among these are: (1) development of clean, convenient ash disposal; (2) elimination of dust and dirt; (3) elimination of smoke; (4) promotion of convenience in use to offset the form competition of gas and liquid fuels; and (5) reduction of the cost and space necessary for storing coal and disposing of ashes. New equipment is needed for locomotives, hand-fired furnaces and pot-belly stoves and such markets as the metallurgical, chemical and ceramic uses, gasification, liquid fuels from coal, air conditioning, etc.

Progress in the development and utilization of coal, said Mr. Baton, is largely research and engineering. Coal must offset the neglect of the past by backing the program to the limit.

Research was coupled with public relations by Fred S. McConnell, president, Enos Coal Mining Co., Cleveland, Ohio, and the National Coal Association, in opening the discussion. The hope of the bituminous industry, he declared, lies in Bituminous Coal Research, Inc., and the Bituminous Coal Institute. Coal must be made cheaper, cleaner and more convenient, and the industry must exert itself to tell its story to the public and win its regard and confidence.

Outlining the B.C.R. research program, Julian E. Tobey, managing director, Upper Monongahela Valley Association, New York, declared that the eight or ten years of modest experience in research should be an advantage now that funds for a real program are in sight. While overnight results cannot be expected, coal and its allies are embarking on the largest cooperative program in history and it will get results without delay.

Raising Mechanical-Mining Output

HOW TO make it possible for mechanical methods and equipment to produce more for war constituted a major part of the deliberations at the 1943 War Conference. Subjects ranged from face preparation and selective mining through working with water, handling rock and conveyor mining under a tender roof to efficient gathering haulage behind loading machines.

"Complete Seam vs. Selective Mining" was analyzed by J. W. Woomer, mining engineer, J. W. Woomer & Associates, Wheeling, W. Va., who discussed the goal and the progress made by various operations in the Pittsburgh seam. He listed his conclusions as follows:

"For the mining industry—Face mechanization is making progress. Some of the industry is forgetting about mining coal and is looking at materials handling. Face mechanization will be increased. Complete seam mining may be worth while in entry work alone.

"For the manufacturer of face mining equipment—The industry does not have the right gobbing machine yet. Basically, the industry wants crew cost but has not forgotten its need for high tonnage per production machine and production section. The industry still wants to mechanize that portion of crew work that seems difficult at the moment.

"For the manufacturer of preparation plants—High crew labor costs and interference with crew loading technique may shift what formerly was a face job in the inside into cleaning plants. The need for preparation plants can be more than a particular size betterment job. The plant may do more good as a face cost implement than it can do as a market implement—or as much. A knowledge of the entire picture of a given mine from the face to the consumer, and of the whole industry, may improve operator satisfaction with new plants.

"For the United Mine Workers of America—Progress toward complete face mechanization is being made. It is a healthy sign that coal and its employees will retain its rightful proportion of the nation's fuel requirements.

"For the fuel consumer—Progress toward complete face mechanization indicates that coal as a future B.t.u. purchase will be sound."

In one operation with which he is familiar, said S. M. Cassidy, manager, Weirton Coal Co., Isabella, Pa., the reject is running as high as 40 percent in complete seam mining yet the production in final clean product was higher. He listed three major advantages in complete seam work: a cleaner mine, with no slate gobbed on the sides, better extraction, and better falls. To make complete-seam mining practical, he warned, the cleaning plant must be able to take care of anything that it may be called upon to handle.

Reversing the usual procedure, L. E. Young, consulting engineer, Pittsburgh, Pa., outlined an unsolved mining problem in obtaining a reasonable cost in thin-vein work. He was followed by three operators who were invited to offer solutions or discuss the problem. Briefly, the problem was mining a 40-in. undulating soft-bottomed wet seam 40 ft. below old and active workings in an upper seam into which about 50 percent of the annual rainfall of 45 in. finds its way. The lower seam was opened about four years with duckbills for entry driving and by this time pump needs total 40 to 50.

The problem was seen primarily as one of drainage by Van B. Stith, general superintendent, Anchor Coal Co., Highcoal, W. Va., inasmuch as the 40-in. steam is thick enough to be mined by any one of several types of equipment. Entries in the lower should be driven under those in the upper, a panel system adopted to facilitate sealing in case of flood and work in the lower seam limited to areas under those completed in the upper. Vertical holes should be drilled to drain the overlying areas and a system of large pipe and/or drainage ditches maintained in the lower vein.

Top cutting with a new hydraulically controlled shortwall machine with caterpillar trucks in the 40-in. (32-in. minimum) "B," or Kittanning, seam overlaid by 6 to 12 in. of bone coal was described by William Lamont, general superintendent, Sterling Coal Co., Bakerton, Pa. Cutting is done in this top bone and no dusting of the kerf is necessary because the cuttings are not dragged back as with bottom cutting. Shaker conveyors are used and in combination with the new top cutters produce 17 tons per man-shift compared to 7 tons hand loading.

The 50-hp. cutters have a range of 27 to 42 in. above the bottom.

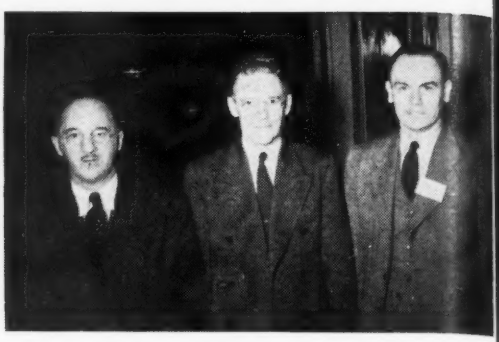
Partly because of the difficulties involved in using electric cables in water, A. D. Long, New York Central Mining Dept., Indiana, Pa., advised against the use of any loading machines in the property described by Dr. Young. As to shakers, he made two recommendations: use them if rooms can be driven to the rise and don't use them if rooms go to the dip more than 2 percent. He offered scoops as a possibility, including the type with bottoms if the mine floor is soft.

Working in Water

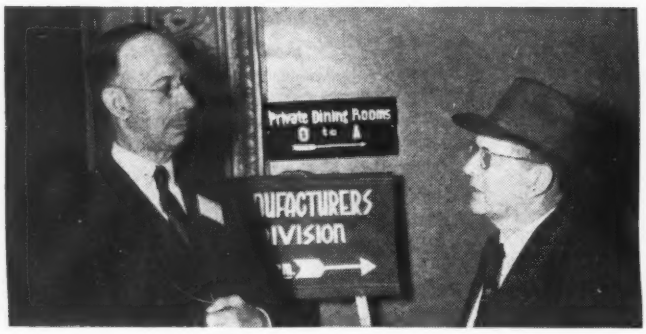
Rubber suits for men, corrugated metal shields over those working at the face, electrically heated drying rooms for changing clothes before the trip out and equipment including 1-hp. 20-g.p.m. V-belt-driven self-priming piston pumps light enough for one man to drag were some of the helps enabling one company to produce 12 to 13 tons per man on development reaching 250 to 300 ft. per month, including rock work in a 40-in. wet seam. The material was loaded onto flat face pans on shaker conveyors. In another mine, the average advance in driving entry with duckbills was 340 ft. per month.

A 73-percent reduction in the cost of lifting 3 ft. of bottom in a 12-ft. entry with a three-man crew by the use of modern rock-drilling equipment was reported by Watson Storey, assistant chief engineer, U. S. Coal & Coke Co., Lynch, Ky. By using mounted drills, the cost per 100 ft.

A. E. Chandler (left), Jeffrey Mfg. Co.; C. E. Hough, general superintendent of mines, American Rolling Mill Co.; P. D. McMurrer and Ralph F. Duyster, American Mining Congress.



A. A. Mills, purchasing agent, Hanna Coal Co. (left); R. W. Wilson, Wood Preserving Co.; C. R. Nailler, general manager of underground mines, Hanna Coal Co.



Dr. L. E. Young, consulting engineer; J. A. Saxe, chief engineer, Island Creek Coal Co.

Thomas L. Garwood, assistant superintendent, Chicago, Wilmington & Franklin Coal Co.; S. M. Cassidy, manager, Weirton Coal Co.

was reduced to $40.80 from a high of $138 with hand-held drills. In both cases, the coal was mined far in advance of rock work. In another method, also using hand-held drills but combining rock and coal loading (that is, taking one cut of coal and one lift of rock), the cost was $74.40. About the same yardage was made by mucking with either the duckbill or a rock shovel. Three drifter drills were mounted on the bumper of an old 6-ton locomotive.

Brushed airways are invaluable as escapeways, said Mr. Storey, and in thin seams rock work can be held to a minimum by using gathering and transporting conveyors. In a 40-in. coal seam, gathering conveyors require no rock work but transporting conveyors will require considerable to get the proper vertical curves if the seam is undulating.

Handling up to 36 in. of drawslate and rock in entries by driving with loading machines with a cost per ton of coal no greater than by hand loading onto conveyors where the slate was held was reported by E. C. Luther, assistant general manager, Peerless Coal & Coke Co., Vivian, W. Va. Coal thickness averages 38 in. The drawslate runs 20 to 36 in. and is overlaid by a fairly solid slate top. Several methods were tried before adopting the mounted loader. A three-heading entry system provides sufficient working places to keep the loader busy. The top rock is shot immediately after the coal is loaded and before the loading machine has left the place.

"Conveyor Mining Under Tender Roof," in the absence of its author, T. E. Jenkins, president, National Fuel Co., Denver, Colo., was read by A. J. Ruffini, vice president, Powhatan Mining Co., Cleveland, Ohio. In the Eagle shaft mine, worked with duckbills in a 6½- to 9-ft. seam under 360 ft. of cover with a tender roof, no more than one room can be driven at a time off a panel entry. After a 300-ft. room 24 ft. wide has been driven up, the 15- to 16-ft. pillar is removed by two slabbing cuts and then the next room is started. In this new mine, opened in 1939 (March, 1940, Coal Age), production was 8½ to 9½ tons per man-shift before labor became scarce. The mine originally worked three shifts but now the tonnage (12 units working) is down to 850 because men cannot be kept on the third shift and not enough are available for the second shift.

Some 12 to 18 in. of top coal is left in both rooms and entries. Room blowers are set 20 ft. from the neck on the intake aircourse. A room is driven up in 20 shifts and the pillars are brought back in an equal number. All entries are pushed to the boundary before room work is started. Recovery is better than 92 percent.

How the labor shortage has increased production per face man and possibly increased percentage of recovery in an Ohio mine where ten duckbills are operated per panel, five on a side, was related by Mr. Ruffini. Lack of men results in about three of the ten duckbills being idle as a rule. Under this condition, however, it makes no difference if the last room finishes ahead of schedule, since the conveyor need not be moved immediately. Instead its crew is transferred to an idle room. There is no loss of coal as sometimes happened when moving time came and some rooms were quite completed. The condition, of course, has cut production per mechanical unit.

Production with shuttle cars and loading machines in the operations of his company was described by G. Stuart Jenkins, assistant general manager, Consolidated Coal Co., St. Louis, Mo. In one mine, said Mr. Jenkins, two shuttle cars work behind each loading machine. Travel distance is about 750 ft. In another mine, with 7½-ft. coal, the shuttle cars load directly into pit cars with a capacity of two shuttle cars.

Use of a cable-reel car also was described by Mr. Jenkins. In one operation where there is close timbering,

bad grades and a loose floor, one such car was assigned to each loading machine. Travel distance was reduced by using straight lines between loading and discharge points. Shuttle cars in another operation discharge to belt conveyors in about 35 seconds. In all these operations, employing about 30 shuttle cars, off-shift shooting is mandatory. Otherwise, continuous production would have been possible.

The advantages of large cars were analyzed by P. R. Paulick, consulting mechanization engineer, Library, Pa., who said that an increase in loader capacity would not increase production unless big cars were used. He stressed the importance of reducing the time lost in changing cars and declared that a survey had shown that loaders actually spent only 40 percent of the available time in loading coal. To increase that percentage it is imperative to reduce the average of 30 percent spent in changing cars.

One mine that changed from 2- to 5-ton cars increased production time 53 percent, said Mr. Paulick. At another, such a change increased production time 45 percent. Still another operation reduced its car-changing time to 10.4 percent and raised its loading time to 77 percent.

A survey in five states was summarized by Mr. Paulick as follows:

Car Size	Tons per Shift	Changing Time	Loading Time
2 tons..	330	27.8	37.6
5 tons..	550	22.0	57.0
10 tons..	700	14.0	70.0

With the use of shakers and mobile loaders, said Mr. Paulick, the ultimate goal should be zero car-changing time.

Conserving Labor and Materials

POWER, ventilation, safety, preparation and maintenance in modern coal mining were discussed by five speakers at the 1943 War Conference.

Including inspection labor, the total maintenance cost of portable ignitron rectifier substations can be kept considerably under 1 mill per ton, declared C. R. Nailler, general manager of underground mines, Hanna Coal Co., St. Clairsville, Ohio. Mr. Nailler expressed the opinion that rectifiers are ideally suited to mechanical mining, and his discussion dealt principally with the favorable experience with four portable rectifier substations installed from 1938 to 1943 in a 4,500-ton fully mechanized mine operating nine mechanical units of about 125 hp. each, with the workings about 11,000 ft. from the main haulage drift portal.

No failures truly chargeable to the tubes were experienced in four years with a 300-kw. sealed-tube ignitron. From that experience, Mr. Nailler concludes that sealed tubes are to be recommended. An 8-tube arrangement in that rectifier revealed an electrical unbalance which would not be true of 3-, 6- or 12-tube designs. The test rectifier in the mine, installed in 1943, is a 400-kw. 12-tube unit using a reactive firing device instead of thyratrons. It is air-cooled.

The other two rectifiers, installed in 1938 and 1939, are 300-kw. pumped-tube units. These, rated at 1,090 amp., have been operated up to 2,200 amp. with the breaker set at 3,000. Arcbacks have occurred but only at loads far above normal. Oversized heat exchangers, said Mr. Nailler, are desirable.

Of the five conversion units serving the mine, the fifth is a rotating machine. D.c. distribution is completely sectionalized by automatic breakers of the tie and feeder types, the former set at 800 and the latter at 900 amp. Portable rectifiers are moved a distance of about two miles every two years and a complete move is made by three men working about 12 hours. In prefacing his account of rectifier experience, Mr. Nailler mentioned about 4,000 ft. as the approximate limit of d.c. transmission. The projection for electrical load centers must be tied in with the mining projection in the concentrated operations of mechanical mining, which shift so rapidly.

Holding total losses to 20 percent while transmitting 250-volt d.c. power as much as 4,000 ft. might require an enormous quantity of copper, observed J. W. Anstead, electrical engineer, Glendora Coal Co., Sullivan, Ind., although he offered no figure for a lower limit. While 10-percent loss at the nips is considered ideal, it may represent a large aggregate power loss. Large losses through excessive waste of power, however, are outweighed by the demoralizing effects on foremen and workmen.

Rotary conversion equipment, Mr. Anstead emphasized, should be given every possible protection against overloads, single phasing, reverse current and so on. He characterized ordinary fusing as more of a detriment than a protection. He offered an arrangement of two a.c. contactors on a panel with their controls connected to the other two transformers as a means of shutting down a set in case of trouble. As to rectifiers, he called attention to their much higher efficiencies compared to rotating equipment in the zero-to-25-percent rated load range.

In a ten-year-old shaft mine producing 2,000 tons, total investment in the ventilating system can be $200,000, and in larger mines with more difficult conditions it may be above $500,000 with no salvage value, said J. A. Saxe, chief engineer, Island Creek Coal Co., Holden, W. Va., in discussing mine ventilation. He presented test data to show the flexibility advantages of variable-pitch-blade axial-flow fans compared to centrifugals. For instance, by adjusting pitch, large increases in volume and water gage can be obtained with no sacrifice, viz:

C.F.M.	Pressure, In. of Water	Efficiency, Percent
224,000	3.5	76
255,000	4.5	76
274,000	5.2	75

Data on the effects of installing an axial-flow fan to operate in parallel with an existing centrifugal of the reto-vane type also were presented by Mr. Saxe. His companies, he declared, have always considered ample ventilation a first line of defense. Lack of positive control of the air, one of the three outstanding causes of inferior ventilation, often results in only one-third to one-half of the air entering the mine being used efficiently. Other outstanding causes are deficiency in initial volume and improper coursing. The whole system should be planned or revised to secure a balance and then checked periodically.

Ventilation Cost 2c.

A ventilation cost of 2c. per ton, of which 8 mills is for power, was shown in a survey of ventilation in seven mines ranging from 2,500 to 6,200 tons, reported Walter Housman, engineer, H. C. Frick Coke Co., Pittsburgh, Pa. The survey also revealed an air loss of 30 percent within 1,000 ft. of the fan and 42 percent within 2,000 ft. The principal requirements for efficient, low-cost ventilation, said Mr. Housman, are: actual use of at least 70 percent of the air; velocities not to exceed 800 f.p.m.; regulators on the return side; elimination of sharp angles; no doors on mains unless in pairs to form air locks; driving headings for aircourses straight and on sights; and annual inspections or surveys by the engineering department.

Management's role in safety was the topic of W. D. Cohelia, safety director, High Splint Coal Co., Highsplint, Ky. Management must take care of all physical conditions, including ventilation, and must lead men in safety rather than the men leading the man-

agement. He contended that management confers no favor on a man when it gives him a job. The foreman, especially, must be a leader rather than a driver. Monthly safety meetings should be mandatory for the foremen, but of course cannot be so for the men unless they are paid time and one-half. Mr. Cohelia emphasized the indirect costs of accidents as a result of decreased tonnage through the loss of skilled men.

Foreman Responsible

Safety is the primary duty of a foreman, said W. I. Hill, director of safety, Westmoreland Coal Co., Irwin, Pa. There must be a safety plan and then the supervisors must sell safety and put that plan in practice. About 90 percent of the accidents result from violations of safety laws and rules, and Mr. Hill therefore concludes that we often are too lenient in dealing with violations although we usually correct the physical hazards.

Introduced as having made the longest trip to the conference, M. DuToit, Mines Department, Union of South Africa, Johannesburg, described briefly and extemporaneously the conditions under which the Union produces the 20,000,000 tons annually necessary to keep its war industries going. Most of the output is bituminous, the seams are level, not much pillar extraction is done and the mines are not much mechanized. Unskilled labor underground consists of African natives who come in from the country for three- to six-months' stays and do not bring their families. Work time, portal to portal, is 8¾ hours and the pay is 40c. per shift plus food and housing. White section bosses are paid $6 to $7 per shift. Although miners will load by hand 12 to 18 tons per shift, an overall production of 2 tons per man on the payroll is good. Value of the coal is $1.20 per ton.

In preparation, W. Julian Parton, preparation engineer, Lansford, Pa., discussed the operation of the Lehigh Navigation Coal Co.'s pilot froth flotation plant. Operation of the plant, said Mr. Parton, has indicated that from 50 to 60 percent of the minus 200-mesh solids discharged from the breaker can be recovered by froth flotation. Such coal is high in moisture but low in ash. Cost of operation, said Mr. Parton, appears to be sufficiently low to make the practice feasible, but experimentation along that line still is under way.

Froth flotation conceivably can uncover a large reserve of fine anthracite, said H. R. Hagen, mechanical engineer, Philadelphia & Reading Coal & Iron Co., Pottsville, Pa., but he warned that an expanding market was needed to make the plan workable on any sizable scale.

Heavy reliance on detailed daily reports by machine operators, section foremen, inspectors and repairmen in maintenance at a large mine was emphasized by Thomas L. Garwood, assistant superintendent, Chicago, Wilmington & Franklin Coal Co., West Frankfort, Ill. In the operation in question, all the loaders are of the crawler type, with 29 in use on the day shift and nine at night. In addition, two entry-driving machines are employed. All reports are recapitulated on monthly cards, which serve to forecast complete breakdowns and also facilitate distribution of costs.

Night maintenance is supervised by a night repair foreman, who has charge of 22 men divided into six crews. Three are repair crews and three are two-man crews which handle lubrication. Each repair crew takes a locomotive and tool car. Special low cars are provided for transporting loading machines to the shop for heavy repairs. Dumping equipment on the bottom is maintained by the men who operate it.

Emphasizing Mr. Garwood's points by reiteration, G. W. Stump, maintenance superintendent, Rochester & Pittsburgh Coal Co., Indiana, Pa., added some of his own, as follows: use standby equipment and have it in small units where possible, keep small repair parts close to the working section, manage so that major repairs can be done on the off-shift, make reports complete enough to be really useful, establish load or operating limits to protect equipment and train operators from the standpoint of maintenance as well as production so they can recognize machine difficulties and catch them before it is too late. He made the point that operators are at the machines all the time while the maintenance men see them but a small proportion of the time they work.

Making Stripping More Efficient

OF 18 MAJOR strip mines in Illinois, all but five find it necessary to shoot at least a part of the overburden, declared T. H. Latimer, United Electric Coal Cos., Chicago, Ill., in opening the first War Conference stripping session. Either horizontal or vertical drilling methods or a combination of the two, depending on local conditions, can be used. Drilling and shooting methods must be based on past results modified to meet conditions as encountered. In general, lower banks with material easily displaced are adaptable to horizontal drilling. Increased bank height and hardness of material are handled better with vertical drilling, the change over point being around 50 ft. of overburden. Horizontal drilling, especially in shale, may be cheaper than churn drilling in overburden up to 50 ft., depending upon the height of the bank, thickness of rock and the interval between rock and coal.

Using slides, Mr. Latimer discussed typical problems and their solutions, stressing the fact that experience gained in the past may be helpful in solving the new shooting problems arising daily. In connection with box-cutting he explained how proper shooting of the rock or hard shale, when encountered, could directly affect shovel speed and pit operation in general.

The proper explosive to use, said Mr. Latimer, is the one that yields the greatest shovel yardage at the lowest cost—a problem for the individual mine. He also stressed the fact that safety must come first, regardless of drilling methods and types of explosives used.

A tabulation of vertical drilling and overburden preparation costs (per cubic yard of material) ranging from $0.00735 for 35 ft. of cover to a projected figure of $0.01640 for 80 ft. of cover, was offered by Russell McHugh, Hanna Coal Co., St. Clairsville, Ohio, in opening the discussion. He agreed with Mr. Latimer that horizontal drilling is cheaper than churn drilling up to 50 ft. of overburden with not more than an 8-ft. stratum of hard rock and if the rock is not too close to the coal.

A new cemented carbide-tipped drillhead is making its appearance, said James Hyslop, Hanna vice president. The drill rotates slower, but uses a faster feed.

An instance where, in beginning operations at a property in their north central Missouri field, a 1¾-mile truck road (with steep grades) saved building a six-mile railroad spur, was cited by Howard L. Asbell, truck superintendent, Sinclair Coal Co., Kansas City, Mo., in analyzing haulage systems in strip mining. With railroads limiting themselves to grade of 2 percent or less, some pit operations are better served by truck haulage systems using roads with grades up to 9 percent. In this particular case, he stated, the 9-percent grades were later reduced to 5 percent.

In tracing the development of truck

L. C. Campbell, vice president, Koppers Coal Div.; M. DuToit, Mines Department, Union of South Africa.

Charles B. Baton, George S. Baton & Co.; E. R. Kaiser, Battelle Memorial Institute.

W. Julian Parton, preparation engineer, Lehigh Navigation Coal Co.

D. L. McElroy, chief engineer, and R. L. Kingsland, electrical engineer, Consolidation Coal Co.

haulage, Mr. Asbell recounted his company's experience with 6-, 15-, 40- and 80-ton units. He predicted that 100-ton units are not far away. A 5- or 6-mile (one-way) haul, he felt, is about the economical limit for a truck haulage system, with good roads playing an important role whatever the length of haul. The advantages claimed for truck haulage over rail haulage are as follows: economy, flexibility, dependability, increased hourly production and better supervision and unity in stripping, loading and preparation.

A "circle" haul, said Mr. Asbell, increases loading and preparation by at least 30 percent, using either truck or rail equipment. The haulage system should be geared to the pit production, since it is much better to have trucks waiting than a shovel.

Rail haulage still is economical in some locations, declared T. G. Gerow, Truax-Traer Coal Co., Chicago, Ill., in the discussion. He added another advantage to Mr. Asbell's truck list, namely: shorter runs and steeper grades. Pit hauls, he emphasized, should be kept short. Multiple runways are desirable and main haulage roads should be straight, free of grades and be well drained. A good road consists of a good base and a good surface or hard top or workable material, said Mr. Gerow. In the case of dusty roads, he recommended sprinkling for the driver's safety and for the protection of the road.

Control of drainage in open-pit operation was likened to the modern practice of medicine, which is 90 percent prevention and 10 percent cure, by Lafe Stewart, chief engineer, Maumee Collieries Co., Terre Haute, Ind. In this analogy, surface drainage is prevention and pit drainage the cure. He enumerated the various steps he deemed necessary to the satisfactory solution to any strip-mine water-disposal problem as follows: (1) complete inspection of the property and the procurement of topographical maps, with all natural drainage courses marked; (2) preparation of accurate surveys and maps. For subsequent references by the mine superintendent and others, control points should be spotted at regular intervals; (3) actual paper layout of the lateral and collection ditches and levees with pipes and traps incorporated. To point up his conclusions, Mr. Stewart traced the step-by-step development of such a plan on a drawing of an actual strip-mining area.

Placing discharge pipes across the base of spoil banks at the time those spoil banks are being built, said Mr. Stewart, will eliminate much of the head that pumps around a strip mine have to operate against.

Pumps should be portable and able to pass a certain quantity of solid material, said W. W. Youngblood, superintendent, Midland Electric Coal Corp., Farmington, Ill., in discussion.

Time study is a method of work measurement, said Gene H. Utterback, Enos Coal Mining Co., Oakland City, Ind., in a discussion of time-study and production engineering in strip mining. Stating that time-study and production engineering are but branches of the broader field of industrial engineering and scientific management, he reviewed its history back to 1890.

Dividing a time-study into two classifications of human labor and machine productivity, Mr. Utterback proceeded to show, with the aid of slides, the mechanics involved in carrying out a complete time-study. Selecting a horizontal drilling operation, he listed four factors which are always taken into consideration from the standpoint of labor, namely: skill of workmen; fatigue; physical conditions; and the consistency of the workmen's operation. The start of the time-study was made without a watch, he pointed out, and there had to be a relation between the work to be done and the work done, before the job could merit a time-study.

Before winding up the time-study, allowances are made for periods of rest and all operating delays are taken into consideration. These studies serve as a check between the results obtained and the results expected, and, he declared, are as likely to show up the inefficiency of management as a poor performance on the part of the workmen. Time-studies are useful in training new men for a given job and under no circumstances should they be used as a "shot in the arm."

In the ensuing discussion, it was emphasized that the time-studies are producing results as far as increasing machine production, but that the machine operators will not accept bonus rewards. A time-study will provide a record of what the operator is doing; but the incentive for striving to beat that record and to receive an extra reward is still lacking.

THE FOREMEN'S FORUM

Stray Currents Fire Shots Prematurely

Whence the Currents Come Is Not Clear, for They Are Found in Mines Where Electric Equipment Is Not Used—Better Wire Insulation Needed

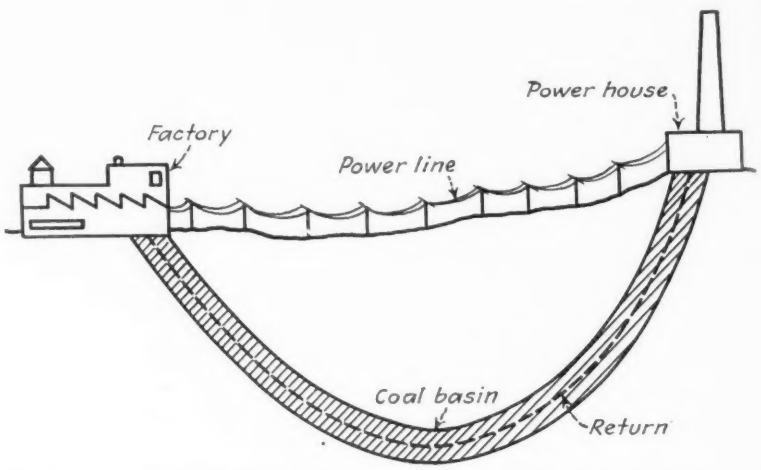
MANY accidents have occurred in the anthracite region from stray currents of electricity, currents which do not travel along a wire but pass through the coal or other measures and fire detonators prematurely. Unfortunately, no one seems sure whence they come or what to do about them. Many believe that they are return currents from the electrical machinery located within the mine which, it is thought, is provided in some cases with an insufficient return, and so the current, having no conductor to take charge of it, wanders by an irregular path through the floor and coal looking for a metal conductor, such as the leg wire or leading wire of a shot, to speed it on its way. But these currents have been found where there is no such underground mine equipment and in other places where the rails are so well bonded as to form a good continuous conductor. In some mines, even the water lines and compressed-air lines are utilized as returns, and this practice the U. S. Bureau of Mines has been advocating.

Insulating the Face—However, some companies are by no means sure that this is safe procedure. May not the current in the air lines travel from these conductors up to the faces of the several breasts? May not the electricity utilize the air lines to travel to the sheet iron on which the coal descends to the battery and thus pass up by this excellent conductor to the faces of the breasts? Those who hold that opinion have been inserting a 24-in. length of rubber air hose in the 1½-in. lines by which air for the jackhammers is carried to the face, relying on this insulation to keep the return current from traveling in that direction.

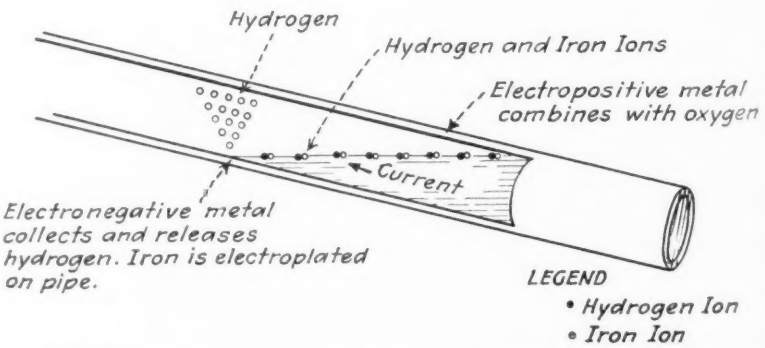
Which Way Does the Stray Current Want to Travel?—Those, however, who believe that the current comes from a regional distribution of return current, such as results from the grounding of electrical equipment by consumers of industrial and domestic current, believe it is desirable to keep the paths for this stray current open so that it will be bled away; so they strenuously oppose breaking the path from the face by the insertion of a length of insulating rubber pipe. Does it want to go outby like the return current from the electric equipment of the mines? Then by all means carry it that way and get it as soon as possible into the main electric return.

Then there are those who believe with C. H. Matthews, mechanical and electrical engineer, Susquehanna Collieries Co. (see *Coal Age*, June, 1931, p. 289), that the mine may be self-energizing. There are in every mine acid waters, steel pipe and rails; could not these form a mammoth battery, from which, and through which, the current could pass? Incidentally, it may be said that the generation of hydrogen in the pipes, which has often been noted, confirms this conclusion, as does also the rapid oxidation of the steel in the mine.

Other Theories to Explain Stray Current—To protect their lines against lightning, public utilities connect to the ground the neutrals of the pole lines they have erected on the surface. These may cause currents that may pass to the mine. They are alternating currents, but may be recti



High-carbon coal conducts coal from outcrops to bottom of the basin and up opposing side.



Indicating how battery may be formed, given acid water and pearlite, sorbite, ferrite and martensite, etc. constituents of steel. Electropositive and electronegative elements may be, and usually are, quite close together.

POWER

THE EXIDE-IRONCLAD BATTERY

HERE is a battery noted for its long-life, tremendous power and extreme ruggedness. The fact that more mine operators use Exides than all other batteries combined is the highest testimonial of its merits.

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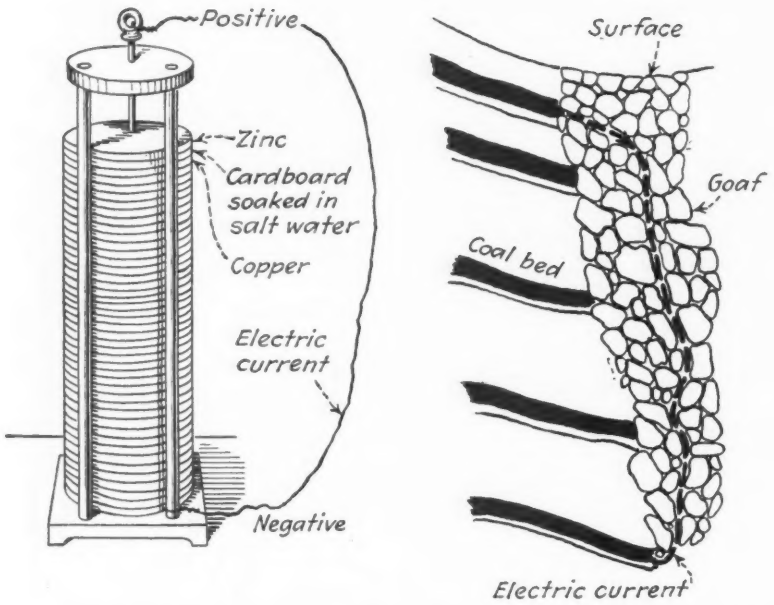


Is the voltaic pile analogous to the coal-mine conditions? Beds of coal, shale, clay and sandstone may act with each other electrically as copper, zinc and water-soaked paper in Volta's electric pile.

fied in their passage through the ground and appear as direct current in the breasts, according to the surmise of Mr. Matthews. Defects in the transmission line, it may be added, also occasionally transfer current to ground. According to Hal Lewis, E. I. duPont de Nemours & Co., however, detonators can be as readily fired by alternating as by direct current.

However, it has been found that stray currents appear in the ground away out in the prairies far away from any public utility operation. They have destroyed the lines of the gas and oil companies' mains. Several beds of coal also might conceivably pair with beds of rock and, sandwiched between damp electrolytic strata, might closely simulate a voltaic pile, thereby creating currents of electricity, such as Volta demonstrated, provided the beds are of sufficiently different electrical characteristics to produce such a result. This idea, however, has not been suggested by the electrical authorities of the anthracite region, and it may be without significance. Stray current, of course, may have more than one origin and some currents may supplement, neutralize or deflect others.

Hard Coal Is a Bad Actor—Anthracite with its high percentage of carbon is peculiarly suited for the passage of electricity, as is indicated by an article by Leland Myer, A.I.M.E. Bulletin 482. This is confirmed by H. B. Freeman in U. S. Bureau of Mines Technical Paper 568. The inclination of the beds makes it possible for the current to be carried from the surface to great depths, but the phenomena now agitating the anthracite regi have been found in bituminous mines als notably near Pittsburgh, where mines an entries even where free of electrical equi ment were found to be alive with str electric current.

Dr. Myer's finds show that the small the quantity of volatile matter, the low the resistance of the coal to the passage electricity, that carbonization makes hig carbon coals quite good conductors an that graphic anthracite, lamp black an metallurgical coke furnish, relatively spea ing, excellent paths for electricity. Th variation in the resistance of anthracite remarkable, and it may have something t do with the relative immunity of som anthracite mines to premature detonatio and the relatively great hazard of other That carbon is a good conductor is spot lighted by the fact that it is used fo brushes and electrodes.

Bureau of Mines Statement—"Th source of stray currents," says U. S. Burea of Mines I.C. 7278, p. 5, "is sometime more or less of a mystery, for such cu rents have been detected in mines wher no mechanically generated electricity wa in use. There appears to be a possibilit that such currents may be generated chem ically in the ground or conducted fro remote fields. Experiments have show that a difference of potential between le wires of 0.75 volt and a current of 0.3 ampere will explode an electric detonator

"In mines using mechanically electrifie equipment considerable current is diss pated into the ground, and a difference i potential might be detected between th rail and floor, between a mine car and the rib and at many other places. Miner should be educated to regard every sur rounding surface as a probable source o blasting power and isolate or insulate the bare ends of detonators and lead wires accordingly" and, it may be added, should see that the leading wires elsewhere are properly insulated throughout their length The problem is one that requires further exploration.

Slack Electric Work Costs Mines Millions

By R. D. CURRIE

District Engineer
General Reinsurance Corp.
Trucksville, Pa.

No man installing electricity in a $2,000 house would rest a wire on a nail and bend the nail over with a hammer and call it an electrical job. He would use an insulator, and he would provide fuses. But these follies sometimes are committed in mines that cost into the millions and are using higher voltages than are used in the home, thus jeopardizing many lives and demanding expenditures for extinguishing mine fires ranging into millions of dollars. The work of some mine "electricians" is almost inconceivably lacking in foresight and explains the great number of mine fires recorded. In the anthracite region, the readiness of the coal to transmit electricity makes the hazard even greater than in the bituminous field, where the coal has less carbon and more volatile matter.

Technical training for mine electricians, a raising of their standing, the establishment of a conscience regarding the character of their work, the recognition of foremen that electrical work must be done well or not at all and that good work takes both time and material are principles needed to insure safety and true mine economy.

Electricians are called on to hurry from one job to another and they naturally skimp their jobs. They are under little supervision and what is supplied by the mine foreman is so inexpert as to be valueless, for the foreman is not electricity-conscious or electrically trained. All he often asks is "Does it work?" He served his apprenticeship long before electricity became a factor in coal mining, and no one has ever tried to give him any instruction or has examined him as to his "proficiency." Too many for a long time had an attitude of hostility to electricity and even delighted in its shortcomings as confirming certain of their antipathies.

Some mines, of course, are outstanding exceptions to this somewhat general condition. Above the grass roots, the work is excellent; below them, every sort of ineptitude can be found, and the electricians spend their time patching and repatching what, if properly constructed at first, thereafter would have needed little repair. A mine with inadequate installation keeps the electrician always behind on his work.

Trips to the mine at night and on Sundays to reconstruct what should not need reconstruction would never be necessary if standards of installation underground followed closely underwriters' rules, as modified to provide for the hazards of roof falls and the acid and other water often dripping from the mine roof. Work in the mines should be superior in many respects to that in homes and industrial establishments, because of the number of men involved, the weak roof, the water, the combustible character of the mine walls and the risk of derailments.

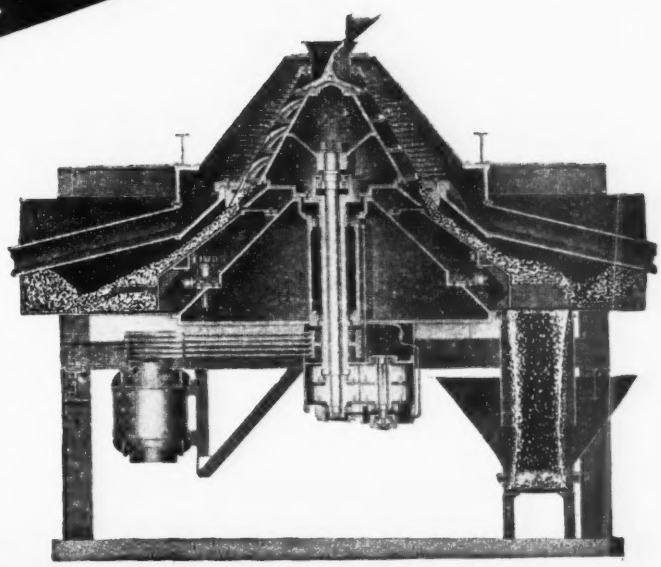
AN *Economical* SOLUTION FOR THE RECOVERY AND HANDLING OF THE FINER COAL SIZES

The coal delivered by this Centrifugal Dryer is in a condition where it does not clog cars, spouts, etc., and does not freeze in transit or storage.

Sludge and slurry coals may be reclaimed and made salable, for with those slurries carrying a large amount of clay, the clay may be washed out and discarded with the dryer effluent.

Or where the sludge consists of good carbon, by use of a closed system practically all of it may be dried and saved.

"C-M-I" *Continuous Centrifugal* DRYER



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STATE-BOARD QUESTIONS

Pa. Bituminous Mine Foremen

Q.—What is shock? Give symptoms and treatment.

A.—Shock is a sudden deadening of the nervous system. When a person suffers from shock, his face is pale and has an anxious expression, his eyelids droop, his eyes are dull and their pupils large, his skin is clammy and covered with a cold sweat; he sometimes is stupid and takes little interest in things around him. He may suffer from nausea and vomiting. When questioned, he will answer slowly. He may be partly or totally unconscious or his mind may wander. Usually, he is perfectly quiet and will not move unless disturbed. At times, a person suffering from shock will be conscious but will breathe only shallowly and feebly; his pulse will be rapid but weak and when pressure is applied to the wrist, the action of the heart will be found difficult to detect.

What to Do to Shock Victim

In cases of shock, a doctor should be summoned at once. The victim should be placed in a comfortable position with his head low, unless his skull is fractured or his head bleeding. All foreign matter—tobacco, chewing gum or what not—should be removed from his mouth. He should be wrapped in warm clothing and kept warm with hot-water bottles, hot bricks or lighted safety lamps; at least that is the recognized manner of heating the body in shock.

However, according to *Science News Letter* (April 3, 1943), Dr. George E. Burch, assistant professor of medicine, Tulane University, and Drs. K. G. Wakin and W. D. Gatch, Indiana University School of Medicine, patients in shock should be kept merely comfortably warm and protected from cold by wrapping in blankets. Hot-water bottles, they say, overheat the patient and will aggravate his shock.

The cold, clammy skin is caused by the defensive action of the tiny blood vessels near the surface of the body, the diameter of which shrink so as to compensate for the decrease in volume of blood due to shock. The body, as usual, goes about correcting its ailment, and the first-aid man should not too drastically interfere with the natural reactions of the victim. Heating the body expands the blood vessels so that more blood flows from them, which is just what is undesirable. The temperatures of animals in shock were controlled by the Indiana University experimenters with water bottles of temperatures ranging from room temperature (77 deg. F.) to a really hot-water bottle of 131 deg. F. and also with ice bags. Both heat and cold greatly shortened survival time, but those animals kept at room temperature or near normal body temperature survived longest. Heat by speeding chemical reactions in the stagnant body sometimes uses up its available oxygen and by increasing perspiration adds to the fluid loss, a deficiency already present in shock.

Men in the mines soon get cold if not positively warmed and, as in shock, they generate little heat, they doubtless should receive heat, but not an excessive quantity. Everyone recognizes that fanning their faces with cool air will aid in reviving persons suffering from shock.

If the patient is unconscious do not put anything into his mouth but pour aromatic spirits of ammouia on a cloth and place it under his nose. Rub his legs and arms toward the body under the blankets. Do not uncover him. As soon as he safely can be removed, have him taken from the mine and placed in a doctor's care.

(3 percent)

Bright and Dark Blood

Q.—How would you recognize arterial or venous bleeding?

A.—Arterial bleeding can be recognized by its flowing in spurts from open wounds or cuts and by its being of a bright red color. It is the purified blood received by the arteries from the heart, and it thus is red. It comes in spurts because the arteries are in direct connection with the heart and the blood rushes through them every time the heart beats. However, after passing through the body, it becomes impure and has to flow back to the lungs for purification and then on to the heart for recirculation. It travels back by the veins and is known, therefore, as veinous, or venous, blood. Such blood also comes in quantity from open wounds and cuts, but in a steady flow, not being directly connected with the heart. The blood from the veins, being impure, is of a darker red color than arterial blood. Capillary blood comes from smaller blood vessels, does not come in spurts but oozes out of the body slowly.

In other words, arterial blood is the purified intake blood from the heart, and venous blood is return blood that has been polluted by passage through the body. The circulation of the blood in the body resembles the circulation of the air in the mine except that the mine air does not, or should not, recirculate, as there is no reconditioning chamber like the lungs in the mine circuit to remove the impurities that the air gathers in its travel.

How Stop Arterial Bleeding

Q.—How would you control arterial bleeding?

A.—By pressing forcibly the artery which connects the wound with the heart against some portion of the bony structure of the body, using for that purpose either a tourniquet or a cravat bandage. The bandage is so arranged as to force a hard body, such as a bolt or piece of coal, to press against the artery. There are 22 points, eleven on each side, where such pressure can be applied effectively.

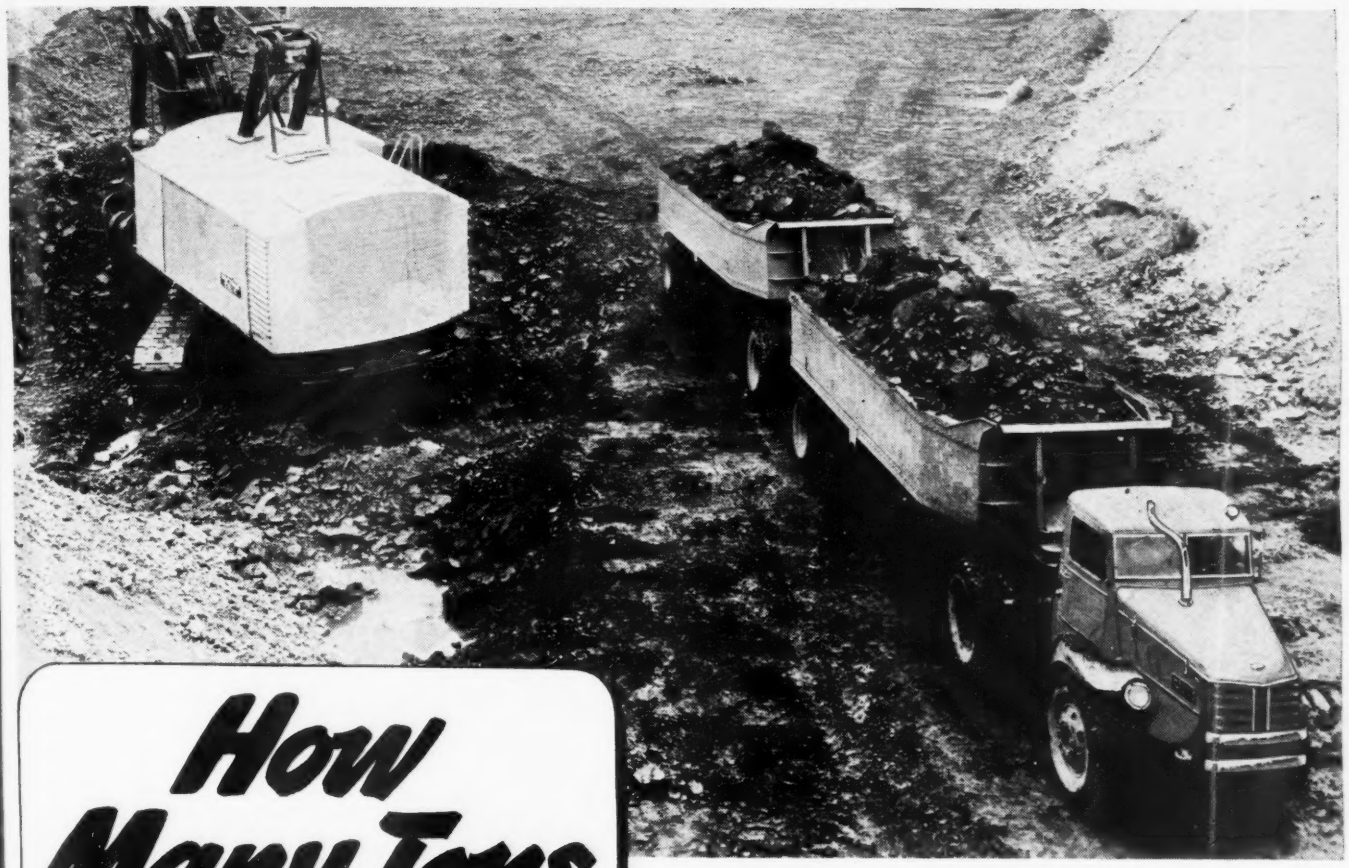
The artery should be pressed by the fingers until someone can arrive with a tourniquet or can prepare to apply a bandage, such as described. A man is likely to die if he loses two or three pints of blood. The pressure should be released every 10 or 15 min. If bleeding is resumed, the pressure should be restored. It is not well to leave a heavy pressure on any organ for too long a period as it may cause the part of the body away from the heart to die from lack of blood. (1 percent)

Mine Foremen, State of Alabama†

Q.—A 12x12-ft. square shaft is partitioned diagonally so that it can be used by the air as both an intake and return airway. If the intake has a velocity of 925 ft. per minute, how many cubic feet of air will enter the mine each minute. Explain how you solve the problem.

A.—The width of the partition is not stated, but it will be assumed that it is 1 ft. thick or 6 in. wide on each side of the diagonal line *AB* drawn from corner to corner of the shaft. In sketch, p. 108, *C* is located where one side *CD*, of the partition meets the wall of the shaft *BE*. Dropping a line from *C* at right angles to the diagonal line of the center of the partition *AB*, it

† Continued from February, 1944, *Coal Age*, p. 106.



How Many Tons

DOES THE PIT RUN COST YOU?

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TRACTOR TRUCKS

BEFORE you buy a truck, ask yourself, "How will it perform in the pit?" This is the toughest run from shovel to plant. Unless your trucks have the traction to haul heavy tonnage on soft, wet, slippery ground and grades, your hauling capacity is held down by this limiting factor.

You suffer no such handicap with Walter Tractor Trucks. You maintain high tonnage under *all* running and weather conditions, because you get the 100% traction of the Walter Four Point Positive Drive. Power is proportioned to each of the four driving wheels according to its traction at any moment. There is no wheel slipping to bog down loads, gouge roads or wear precious tires.

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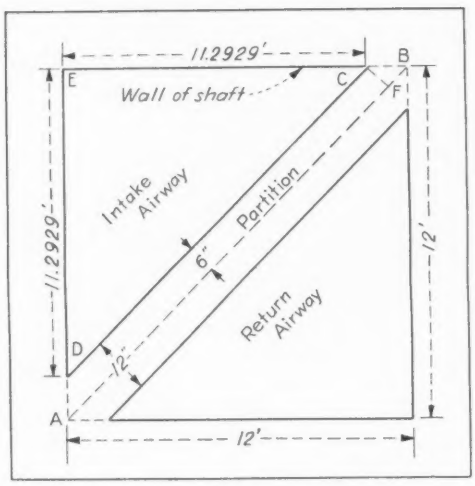
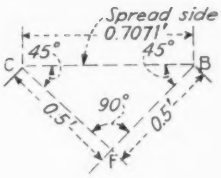
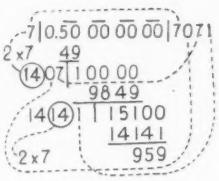






A curtain wall usually is much colder on one side than on the other, as the surface air often is colder or hotter than the mine air. This is sure to bring strains on the curtain wall. For this and many other reasons, such walls are likely to leak, destroying the circulation and increasing cost.

The cool wall will cool the air in the warm side of the shaft and free the moisture from the air. This will make the moisture fall like rain. In consequence, a wet shaft will result, and thus in winter there will be frost and frozen water at the foot of the shaft. Dividing the shaft on a diagonal line involves a longer partition than is necessary and results in more cost, more leakage, more air resistance and repair cost. The triangular shape of the two sections will slow the air travel at the sharp corners and stir the air into turbulence. If difficulties occurred to compel the partitioning of the shaft, it would have been in every way better to split the shaft into two equal rectangles by a central wall.

meets that line at a point that may be designated as *F*.

As it has been dropped perpendicularly on *AB* it forms a right angle at *F*.

FB is on the center line of the partition and, as the shaft is square, the angle at *B* is half a right angle, or 45 deg. Thus in the triangle *CFB*, which has been redrawn on an enlarged scale to the right, we have a right angle at *F* and a half right angle at *B*. In every triangle the sum of the angles is equal to two right angles. Hence, the angle at *C* also must be a half right angle, or 45 deg. Thus the triangle is symmetrical and $CF = FB$. As $CF = 6$ in. $= 0.5$ ft. *FB* also must be 0.5 ft. and, as the square of the "spread side" of a right-angled triangle = the sum of the squares of the other two sides considered separately, CB^2 must equal $CF^2 + FB^2$ and $CB = \sqrt{(CF^2 + FB^2)}$ or $\sqrt{(0.5^2 + 0.5^2)}$ or $\sqrt{(0.25 + 0.25)} = \sqrt{0.50} = 0.7071$ (see figure).

Thus, the length of the side of the shaft not occupied by the partition *EC* will be $12 - 0.7071 = 11.2929$ ft. *DE* also will be 11.2929 ft. long. The area of a triangle equals its height multiplied by its base and divided by 2, but any side can be chosen as base and the height will be the length of the line which is at right angles to that base if there is such a line. Therefore, the area of the triangle $= EC \times DE \div 2 = 11.2929 \times 11.2929 \div 2 = 127.53 \div 2 = 63.76$ sq.ft.

As the equivalent of a column of air 925 ft. high enters the shaft every minute (see question) and as the cross-sectional area of that column is 63.76 sq.ft., the volume of air entering every minute will be the volume of such a column, or $925 \times 63.76 = 58,978$ cu.ft. In consequence, the shaft will pass 58,978 cu.ft. per minute.

Why the Partition?—The first reaction to this question was that the examiner was seeking to find out if any of the examinees would come out in condemnation of this dangerous and unprofitable arrangement. With it, air is likely to recirculate, and thus, by reason of recirculation, a million cubic feet of gas may add up to two million cubic feet or more in 24 hours. Also, dust, carbon dioxide and, in case of a fire, carbon monoxide will recirculate in similar manner. Many mines finding their returns have too much methane have increased their air circulation, but the better way is to remove the methane completely with each swing around the circle, and thus make such excessive air unnecessary.

Mine Foremen, West Virginia*

Q.—Why is it not advisable to fight a mine fire by flooding? (1942, Fires and Explosions, p. 124).

A.—It is inadvisable to fight a fire by flooding because of:

(a) Heavy damages to mine and equipment.

(b) Expense of dewatering the mine after fire is believed to be extinguished.

(c) Impossibility of ascertaining if fire is extinguished.

(d) Length of time that workings are idle by reason of flooding.

(e) Possibility of generating explosive and dangerous gases by insufficient quantity of water in fire area.

[(a) When water gets into the roof of a mine above the coal level, it may cause the roof shales and clays to expand, thus forcing themselves down and the roof below them. The latter may sag down without actually falling, for it has the water to aid in sustaining it, but it will fall as soon as the water is removed. The extent of the damage will depend on the quantity of such expansible clays and shales and on the degree to which they have been wetted before the flooding occurs.

[The rising waters enter the roof and, in consequence, when the support of the water on the lower side of the roof is removed the weakened rocks may have several feet of water above them and no water below, and heavy caves will occur. Furthermore, by reason of their wetting, the wet rocks will have little strength to meet such stresses.

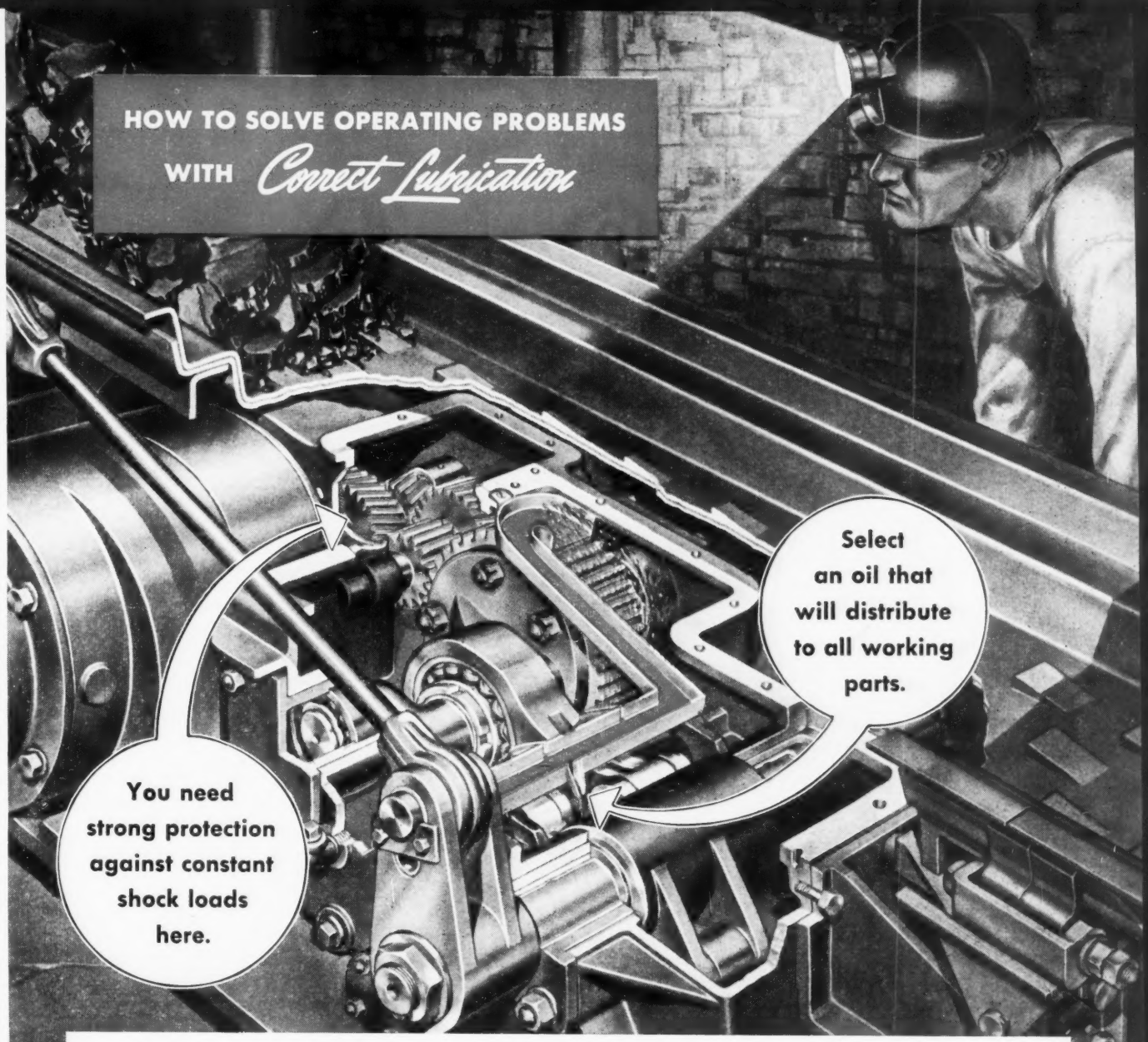
[The equipment, on the other hand, may suffer little by being drowned, if the flood is not continued long enough to corrode the metals of which it is made. The water that is admitted to the mine to flood the workings should be reasonably pure so as to reduce corrosion. If the iron-sulphur compounds in the workings are old, they may be ferric, not ferrous, sulphate and so may not be dissolved in any appreciable measure. However, the real fear is that the insulation may be damaged. Little harm is done to insulation merely by flooding. The damage is in its drying out or in the use of the equipment before the drying is completed.

[A closed motor should have insulation that is resistant to temperatures 55 deg. C. above room temperature, which is 25 deg. C., so it should withstand 80 deg. C. If, in the drying of the equipment, the temperature is not raised above 80 deg. C., no harm will result, unless the heat is applied so fast that the steam thus created establishes a pressure sufficient to rupture the insulation. If the motor is of open type, its insulation is of a kind that may fail when the temperature is raised 40 deg., or to 65 deg. C. above room temperature, so more care must be exercised in drying it out. Whatever the type of insulation, it is well to make haste slowly because the temperatures may be exceeded or the steam may not be bled off as fast as generated. Provision must be made for the escape of moisture from the chamber in which the equipment is baked.

[In drying, the revolving part (called also the "rotor" or "armature") should be separated from the stator (the field coils), and they should be dried separately. They may be baked in an oven or dried by hot air or by infra-red rays, which latter heat the insulation and coils from the inside out. They also can be dried with safety electrically if only about 10 percent of the normal voltage is passed through the windings until the drying is effected. Care must be taken to see that the drying is complete because, in the earlier stages, when the heat is turned off the resistance will be found to increase. If, when the heat is still being applied, the resistance is uniform and remains uniform, it is evidence that the equipment is dry.]

(To be continued)

* Continued from May, 1944, *Coal Age*, p. 100.


HOW TO SOLVE OPERATING PROBLEMS
WITH Correct Lubrication
Select an oil that will distribute to all working parts.
You need strong protection against constant shock loads here.

Soften Shocks in this Shaker!

BACK AND FORTH . . . back and forth . . . back and forth . . . for hours at a time. That's the story of what happens inside this shaker conveyor drive.

Here the lubricating oil, splashed on gears and bearings, is subjected to constant shock loads. It must resist rupture to protect the gear teeth and bearing surfaces . . . yet it must distribute freely to all working parts to keep wear down to a minimum.

Gargoyle Vactra Oil AA meets these specific shaker drive requirements. It forms strong adhesive films that stand up under the continuous shock loads. Its correct body assures complete distribution throughout the entire mechanism.

Protect your shaker drive with Gargoyle Vactra Oil AA, and ask your Socony-Vacuum representative for the right oils and greases for all your mechanized equipment.

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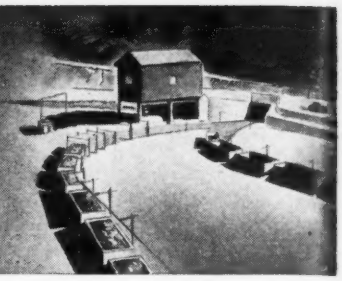
ONE OF A SERIES OF SUGGESTIONS TO AID PRODUCTION

CALL IN SOCONY-VACUUM

TIMELY OPERATING IDEAS



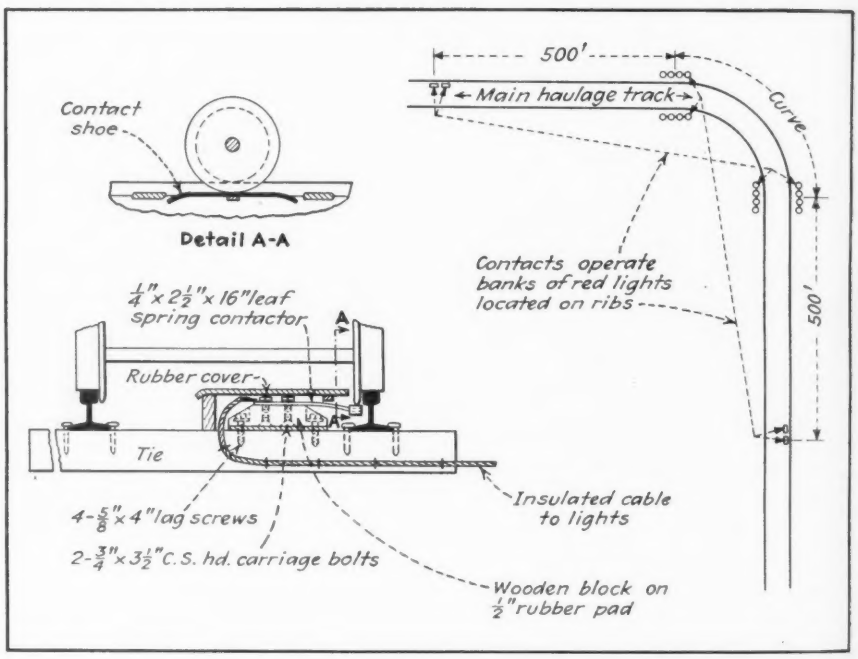
Warning Lights Blink on Both Ribs

"SAFETY and freedom from collision on curves is secured and maintained at the mine of the Powhatan Mining Co., Powhatan Point, Ohio, by a simple and comparatively inexpensive flasher system which operates by contacts from the mine-car wheels," reports Edward Fellabaum.

"At both ends of all curves on the main haulageways are installed two banks of red lights (one on each side of the entry). When a trip approaches to within 500 ft. of a curve, these banks of red lights (on the opposite end from the approaching trip) begin to flash alternately, giving a vivid and positive danger signal like a mighty hand waving a huge lantern. This effect is obtained by using two contactors whereby each car wheel (on one side of the car) causes one bank to flash and then the other.

"The accompanying sketch shows a typical arrangement for a simple curve where there is no junction or sidetracks, although we have some installations where both junctions and sidetracks may cause trips to conflict. Contactors and lights at these points, of course, are placed where needed for safety and convenience.

"The initial installation of 16 banks of lights (20 contactors) was completed in three days at a cost of eight man-shifts and a material cost of less than $100. This included making the parts, assembling the contactors and everything incidental to the job. Maintenance is low and one man can service the entire mine in less than a shift (which is necessary about once a month).



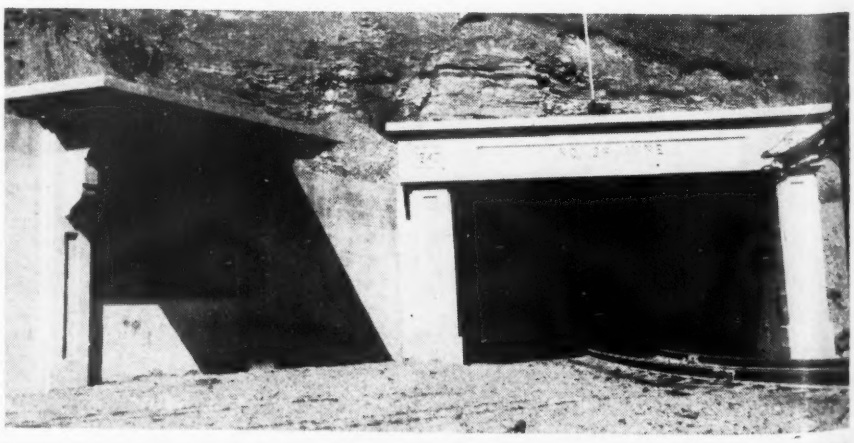
How a wheel-actuated contactor operates the warning lights.

"All lead-in wires to contactors are encased in short lengths of hose and all parts are covered with mats of discarded conveyor belt. The distance at which contactors are placed from the curve, of course, is governed by the length of the trip hauled. It should be such that the lights will continue to flash until the locomotive is around the curve and on the straight track.

"These flashers are a mighty factor for safety, for the warning given is distinctive and cannot be confused with any other signal," Mr. Fellabaum declares.

Bulletin Board Cast Into Concrete at Main Portal

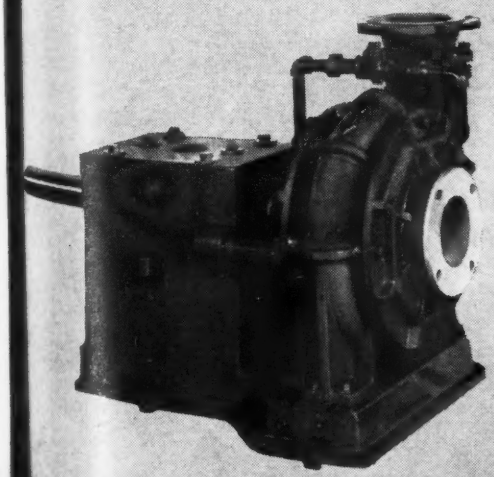
NO PAINTING or other maintenance should ever be required on the housing of the pit-mouth bulletin board shown herewith. It is cast as a monolith with the concrete wing wall that protects the new portal on the high side. Columns, brackets and the cap piece are of decorative design which imparts to the whole a stability and dignity that commands attention. As built into the wall the board takes up no yard space and does not present a "back" to accumulate trash or leaves that may blow about. The mine is a large operation in the Pocahontas field. It was opened only a few years ago and has a long life ahead.



Decorative and requires no maintenance.

"HYDROSEAL"

AWARDED MEDAL OF MERIT BY THE FRANKLIN INSTITUTE



The Franklin Institute of the State of Pennsylvania was founded in 1824 and is the oldest institution in the United States for the Advancement of Science and the Promotion of the Mechanic Arts. Annually, since 1890 the Institute has awarded the Edward Longstreth Medal of Merit for Invention. The list of inventors and inventions so honored contains many world-famous names which you would instantly recognize . . . This year the award was bestowed for the invention of Hydroseal. The actual citation from the Institute reads as follows: "In consideration of the development of a pump (Hydroseal) which will successfully handle water or liquids, containing abrasive materials, retain its initial efficiency and original discharge for considerable periods, with low maintenance costs and the successful manufacture of this type of pump (Hydroseal) giving satisfactory operation in many installations" . . . If you'd like to know more about the Hydroseal Pump, write for Catalog No. 140.

HYDROSEAL PUMPS

SAND AND SLURRY TYPES — *MAXIMIX PROTECTED*

THE ALLEN-SHERMAN-HOFF CO., 231 S. 15th Street, Philadelphia 2, Pa.

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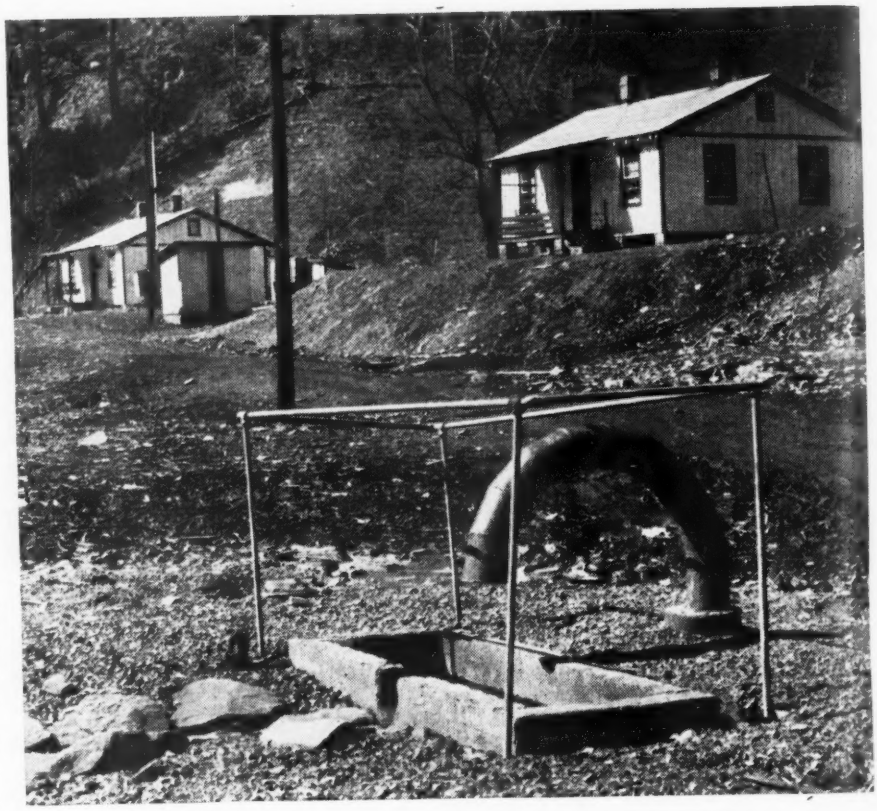
Methane Pumped Through Erratic Stratum

PUMPING OUT GAS and burning it is being continued at a mine in the Pocahontas field on the border of Virginia and West Virginia. When a pump discharge borehole was put in recently near one of the operating gas vacuum pumps the drillers and engineers were amazed that no "vacuum" was encountered and neither did any gas appear.

How the development workings in this mine were practically rid of methane by boreholes drilled in a hollow to a depth of but 85 ft. where the coal seam has 180 ft. of cover was described in a feature article in the May, 1943, issue of *Coal Age*, p. 87. Pulling gas out of a more-or-less broken stratum encountered near that depth caused a marked reduction in the quantity of gas entering the development workings in the coal seam 100 ft. lower than the bottom of the hole. There was very good evidence that the effect of the vacuum created in this stratum of the cover extended 4,000 to 5,000 ft.

Therefore, when a 10-in. borehole was to be drilled through the 180 ft. of cover in the hollow and only 200 ft. from one of the operating gas pumps, it was expected surely that air would be pulled down that hole and toward the gas pump. No such thing took place and, although other boreholes in the vicinity discharged methane at the rate of 150 c.f.m. or more (before pumping was started), this water hole showed no sign of discharging gas. The new borehole was cased with a 6-in. pipe grouted to the coal.



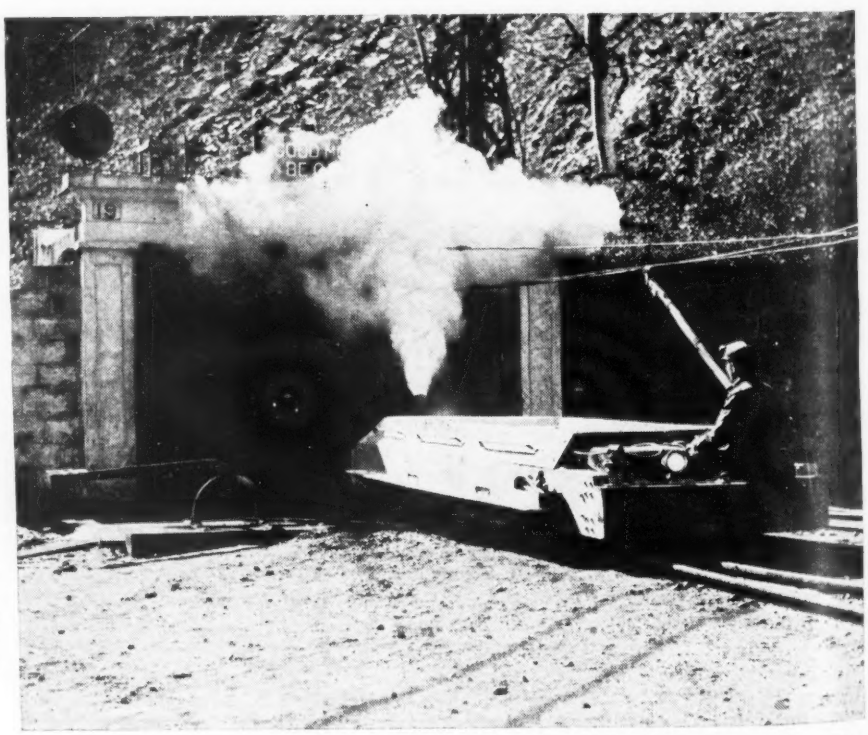
Pump discharge (foreground) is 200 ft. from a gas borehole which has been pumped continuously for about two years. This vacuum gas pump is in the small building this side of the dwelling at the left. Pump is in operation and gas is burning.

Big Rock-Duster Resembles Cable-Reel Locomotive

CONTINUOUS MAINTENANCE of effective rock-dusting in a large mine calls for speed so that the job can be done during the few off-shift hours available. In addition to effecting a cost reduction and promoting safety, the labor saving on high-capacity equipment adds just that much to the labor pool available for the direct operations of mining.

At a mine in the Pocahontas field a self-propelling duster has been built and put into use that is said to dust four times more entry per hour than the "large machine" formerly used. This new unit is equipped with cable reel, has a 40-bag hopper and includes a patented feature consisting of a power-driven oscillating nozzle. Details of the construction are not available at this time.

The high-pressure blower is of a large size which will force the dust through 500 ft. of hose for dusting trackless headings. Being of heavy construction, the unit can pull cars loaded with rock dust and can switch parked cars out of the way, thereby materially reducing delays. Height of the duster is 30 in. above the top of the rail. With this machine the large mine can be dusted once a week.



In this demonstration the camera caught the first spurt of dust and the nozzle at one side.

THE COST OF
Tomorrow's Peace

Today peace-loving Americans are united with thirty-three other nations in a common objective of destruction.

Millions of our fine, young men and women find themselves invading foreign lands in order that their own shores may be spared, and their free way of life preserved.

Their sacrifices will be great. Their job will be well done.

But what of the job they will expect of us when they have finished theirs . . . the job of turning their hard-won victory into a lasting pattern of peace?

Can we come up to their great expectation? We must realize that this is the last opportunity of our generation. We must do a better job of it than we did in the Twenties and the Thirties.

We have our backs to the wall, and the scars of World War I and a thirteen-year depression still are upon us. The final test of our way of life is at hand!

As we look over our shoulder into the immediate past, we see little to encourage us. But we also see much to make us pause. We see a tremendous fighting machine, created in a matter of months by the miraculous organization of our resources.

We, the largest of the peace-loving nations, have overnight become masters at the business of waging war. Today, as a result of the coordination of industry, labor, and government, we are producing ***for war alone*** as much as our total normal production for peace.

* * *

We have amply demonstrated our ability to harness the vast productive capacity we possess. Why cannot these resources, which we have organized so efficiently for the destruction of life and property, be directed toward the destruction of the causes of war?

May not the patriotic and emotional strength and the unity of action which have been stimulated for the purpose of winning the war be directed, at least equally well, toward the attainment of world peace and international harmony?

If they are not so directed, what lies ahead but another war? And how can America, in a world that is so rapidly shrinking in size, avoid involvement in ***any*** of tomorrow's conflicts?

International peace is an ambitious dream and its price is high, but the price of war is even higher. Our world cannot long survive the periodic waste of its human and material resources.

Our country can be the most potent single force in bringing about the international understanding that leads to peace, in developing the unity that will make the most of the ample resources nature has provided everywhere.

* * *

There is no unity in selfishness. There can be no unity if any one of the great powers fails to do its part in determining and eliminating from the world the basic causes of aggression.

These basic causes stem from greed and the suppression of opportunity for individual progress; for self-preservation is the first law of nature.

Mussolini's dramatic march on Rome in 1922 was made possible by disillusioned veterans of World War I who could find no jobs and whose future held no promise. Some of Hitler's most

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Similarly, peaceful reconstruction of our world economy depends on the ability of nations to reconcile their differences in a series of working agreements.

If we in the United States want lasting peace and if we want to preserve our democratic way of life, we must take over our full share of the task of initiating these compromise measures. Acknowledging our inescapable responsibility as the greatest economic and military power in the world, we must attempt to insure the free flow of world trade, and develop—with profit for both parties—backward areas abroad as well as at home. And we must do this by making all nations share the responsibility, not by allowing ourselves to be manoeuvered into being an international Santa Claus.

With our allies, we will have to see to it that the devastated portions of the world rehabilitate themselves as quickly as possible; that practicable and realistic trade and economic relations between nations are developed; and that the energies and productive capacities of these nations are set free to function in a climate that is favorable to the growth of free enterprise and individual initiative. As the most powerful economic force on earth, we have the most to gain and the most to lose at the peace table; and we must never forget that with our power comes responsibility.

We cannot hope to solve all of the problems of all nations—nor even all of our own—but our way can become the way for more of the world's humanity. Our strength can become the guiding spirit of the smaller nations.

* * *

In the development of a sound American foreign policy, let us take care not to attempt to control the destinies of other nations. Let us remember that we must set the example of self-determination of independent, free peoples.

Freedom is essential to international peace; and free competition—whether it be between individuals, between businesses, or between nations—is the mainspring, the synchronizer, and the preserver of freedom. For competition always is synonymous with private enterprise.

We are not a covetous nation. We have no territorial ambitions. Our international commercial aspirations are dominated by the conviction that we have a great stake in world unity and world prosperity. We know that we can no longer live apart from other nations and that we cannot ignore the fundamental elements which affect the well-being of other countries.

Our foreign policy must encompass a world of trade, and help develop it.

We dare not blunder in the execution of that foreign policy if the American way of life is to survive. A democracy resolved upon isolation is doomed in the world of tomorrow.

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We still are free to decide our own fate—still free to shape our own future. We still are free to preserve the liberty and happiness that has made our country the hope of the world.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

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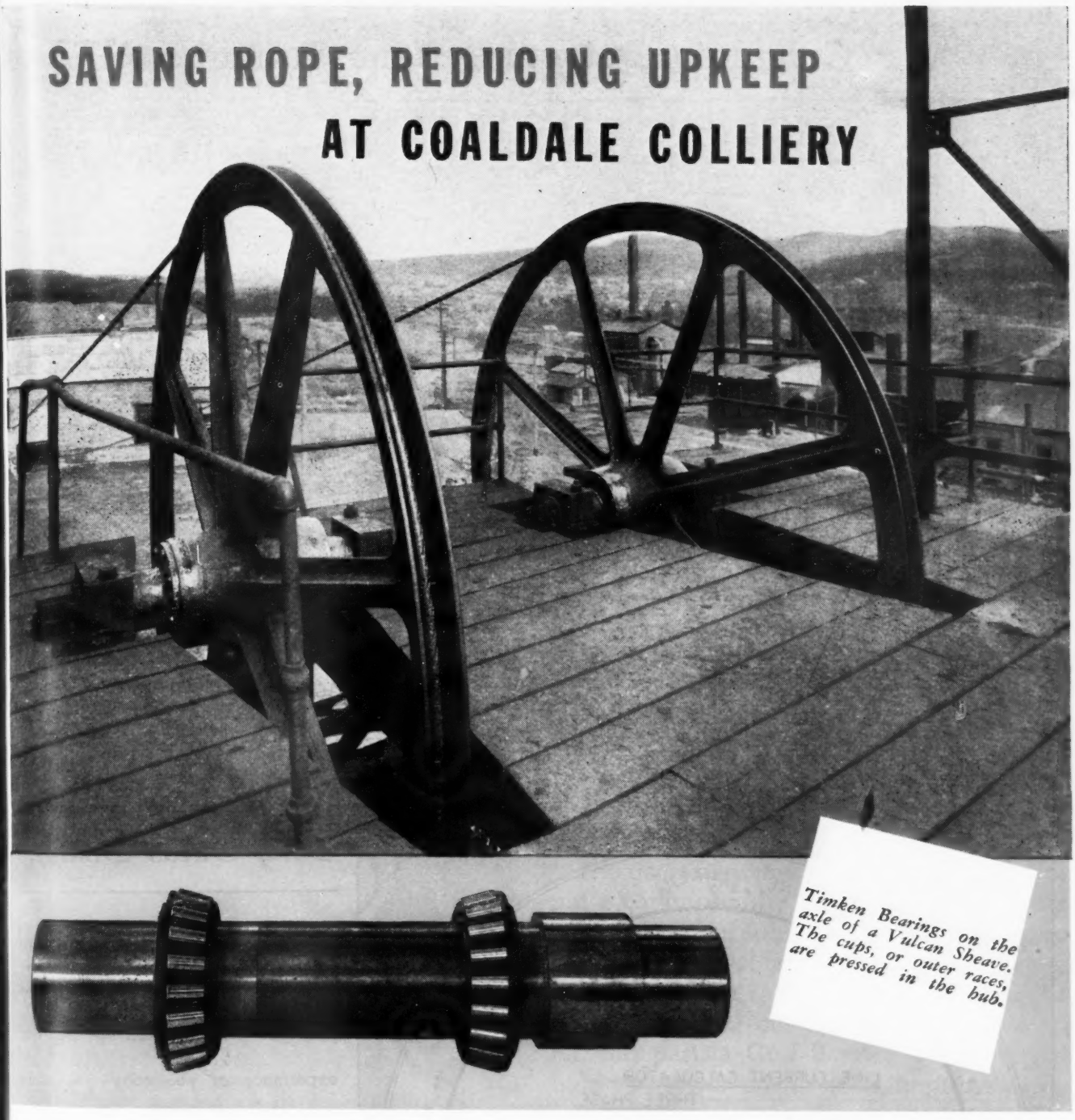
SAVING ROPE, REDUCING UPKEEP AT COALDALE COLLIERY



Timken Bearings on the axle of a Vulcan Sheave. The cups, or outer races, are pressed in the hub.

These 12-foot Vulcan "Allcasteel" Hoist Sheaves installed at the Coaldale Colliery of the Lehigh Navigation Coal Company are mounted on Timken Tapered Roller Bearings to assure utmost freedom, smoothness and steadiness of rotation.

Sheaves can't "shimmy" or wobble on Timken Bearings because they can't get out of alignment. Timken Bearings produce tremendous lateral stability; are practically friction and wear free; carry radial and thrust loads with a wide margin of safety. Thus excessive wire rope wear is avoided.

Furthermore, because lubrication is simple and positive, there is no chance of the bearings "freezing" or jamming; therefore no danger of flat spots being worn in the sheave by the rope. When buying new sheaves of any type make sure they are Timken Bearing Equipped. The Timken Roller Bearing Company, Canton 6, Ohio.

5TH WAR LOAN

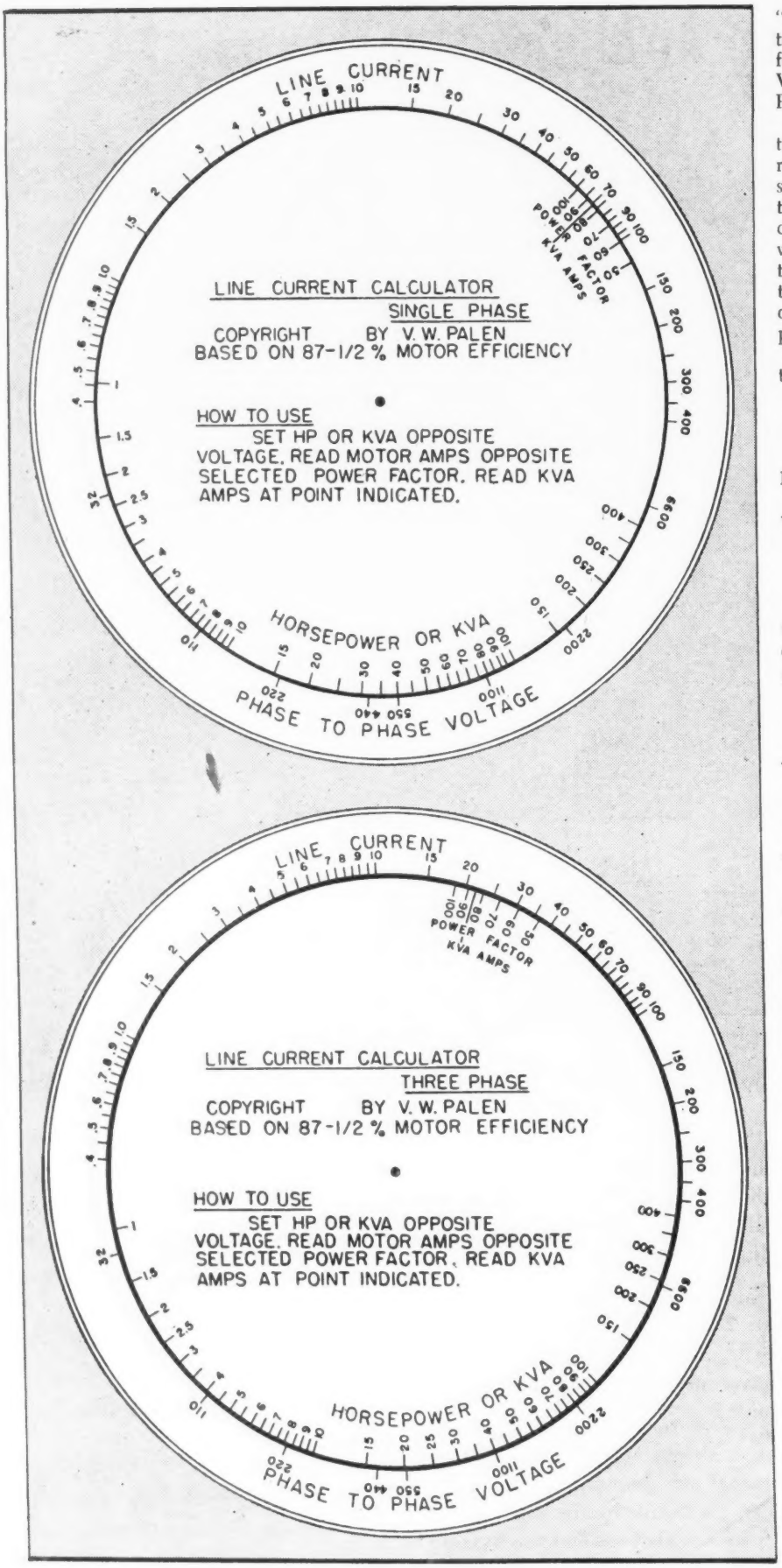
"Fight by his side."

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

Calculator Determines Line Current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POWER FACTOR
KVA AMPS
LINE CURRENT CALCULATOR
SINGLE PHASE
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BASED ON 87-1/2 % MOTOR EFFICIENCY
HOW TO USE
SET HP OR KVA OPPOSITE VOLTAGE. READ MOTOR AMPS OPPOSITE SELECTED POWER FACTOR. READ KVA AMPS AT POINT INDICATED.
HORSEPOWER OR KVA
PHASE TO PHASE VOLTAGE
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HORSEPOWER OR KVA
PHASE TO PHASE VOLTAGE

"HERE'S A line current calculator for determining amperes in motor and transformer circuits," writes V. W. Palen, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

"Cut along the inner and outer circles to make two rings and two disks. Using rubber cement, mount these pieces on separate pieces of cardboard. Reassemble the respective pieces and carefully punch center holes. Insert brass bolts (with washers) to hold parts together. Add nuts to the bolts and tighten. The disks should turn easily, yet hold their setting. A drop of solder on the nuts makes the assemblies permanent.

"The single-phase unit solves the equations:

$$I = \frac{Hp. \times 746}{E \times PF \times Eff.}$$ (for motor current)

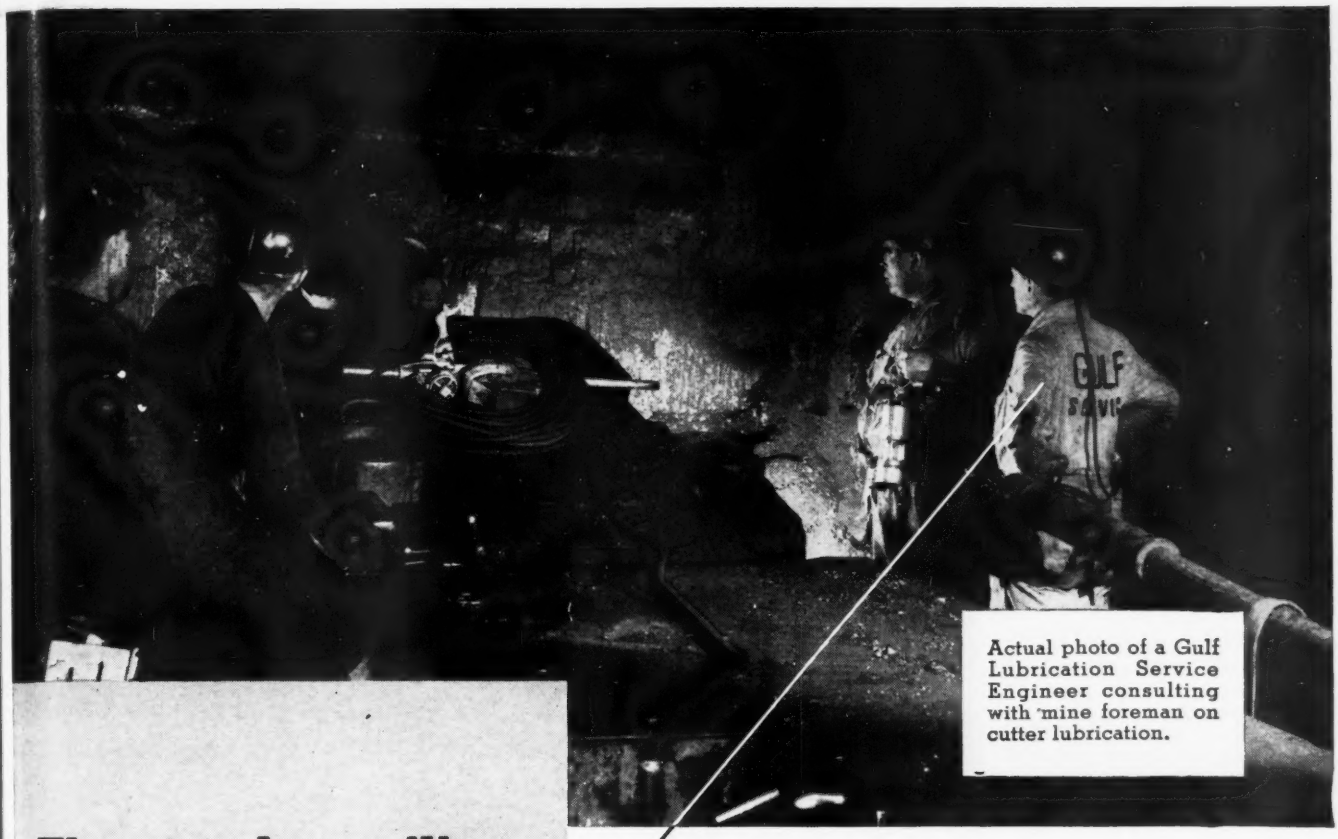
$$I = \frac{Kva. \times 1000}{E}$$ (for transformer current)

Where: E = voltage between line wires
PE = power factor
$Eff.$ = efficiency (87.5 percent assumed)

"Three-phase equations solved by the three-phase unit are the same as above except that the denominator of the fraction includes $\sqrt{3}$ or 1.73."

Any Ideas Today?

Others can't read about your idea until it's in print. The practical books you read today contain the recorded experience of yesterday — solutions to problems that had to be whipped. You have the answer to some problem that bothered you. Why not take thirty minutes to tell industry how you recently solved an electrical, mechanical, operating or safety problem? Send it in — with a sketch or photo if it will make it clearer. For each acceptable idea, Coal Age will pay $5 or more on publication.



Actual photo of a Gulf Lubrication Service Engineer consulting with mine foreman on cutter lubrication.

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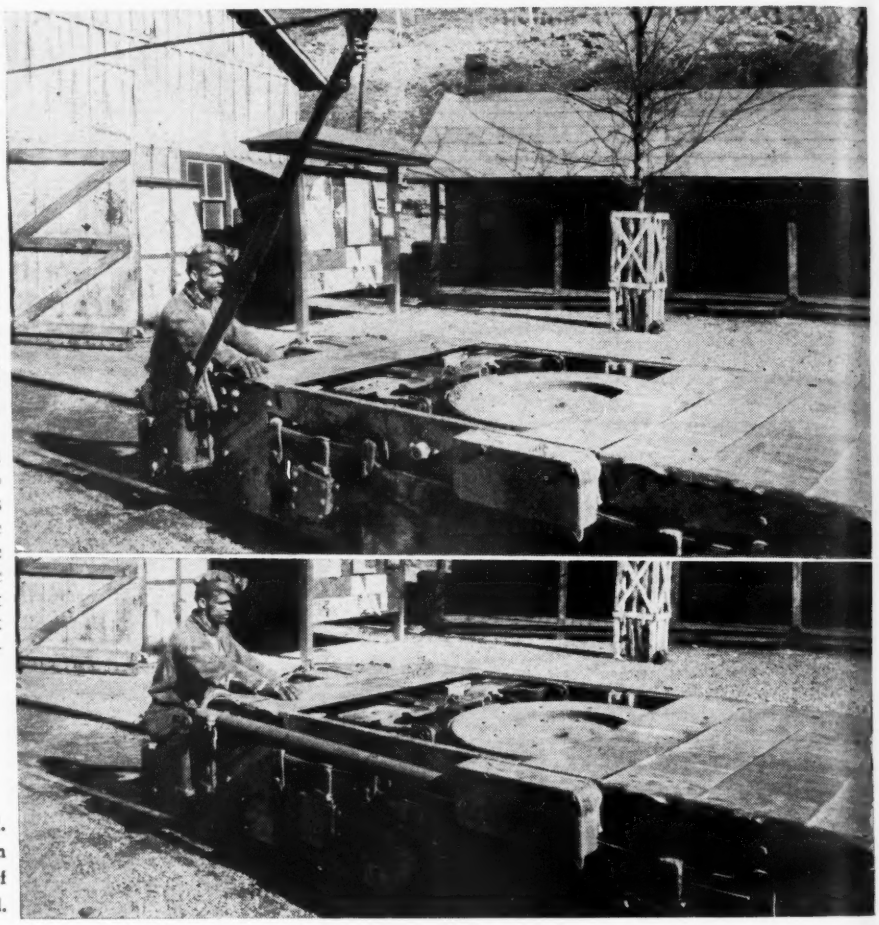
When Pole Is Dogged Cable Reel Is Connected

WHAT THE USERS consider as the simplest and most trouble-free method of shifting the wiring connection of a locomotive from trolley pole to cable reel is illustrated by the two accompanying illustrations. The arrangement is an old one but not widely used.

Instead of the usual hook for dogging the pole, attached to the side of the locomotive is a box with the bottom and one end open to receive the pole, hold it down and guard the live parts consisting of harp and shoe. A copper plate in the top of that box is connected to the brushes of the cable-reel collector ring. The pole spring keeps the shoe tightly up against that plate and the power then feeds through the trailing cable on its way to the pole.

Officials at this large mine in Virginia where all gathering locomotives are so equipped explain that the cable-reel nip is sure to be dead while the pole is on the wire. The harp and shoe of course are alive when the reel is in use but the dogging box is so deep that a man cannot accidentally touch them. To get a shock he would have to put his whole hand purposely up into the box from the bottom.



With pole on wire, nip is sure to be dead. In dogged position the pole shoe is in contact with a copper plate in the top of the box and connected to the cable reel.

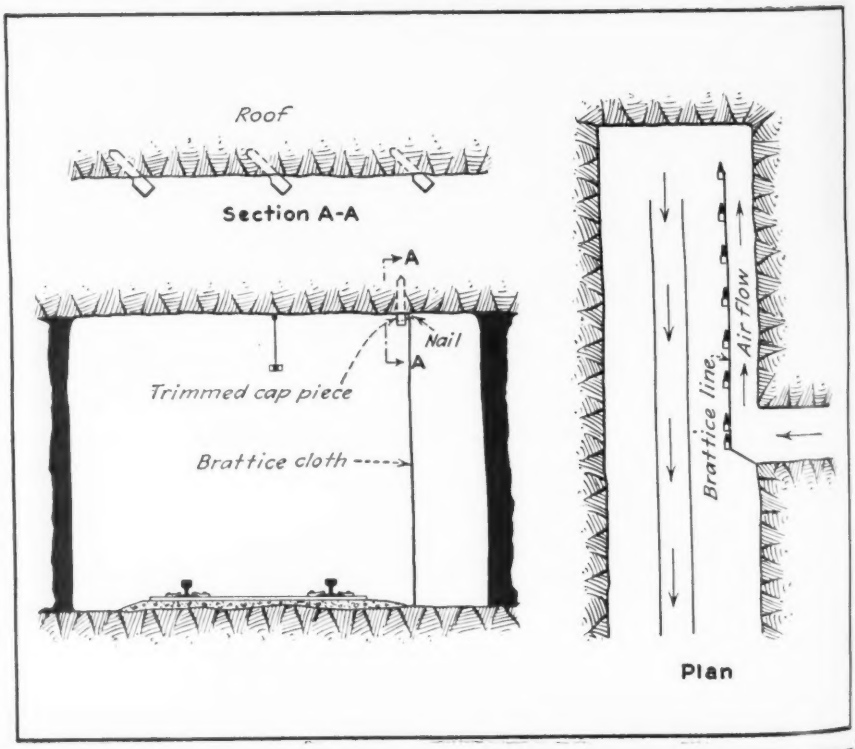
Driller Provides Brattice Supports

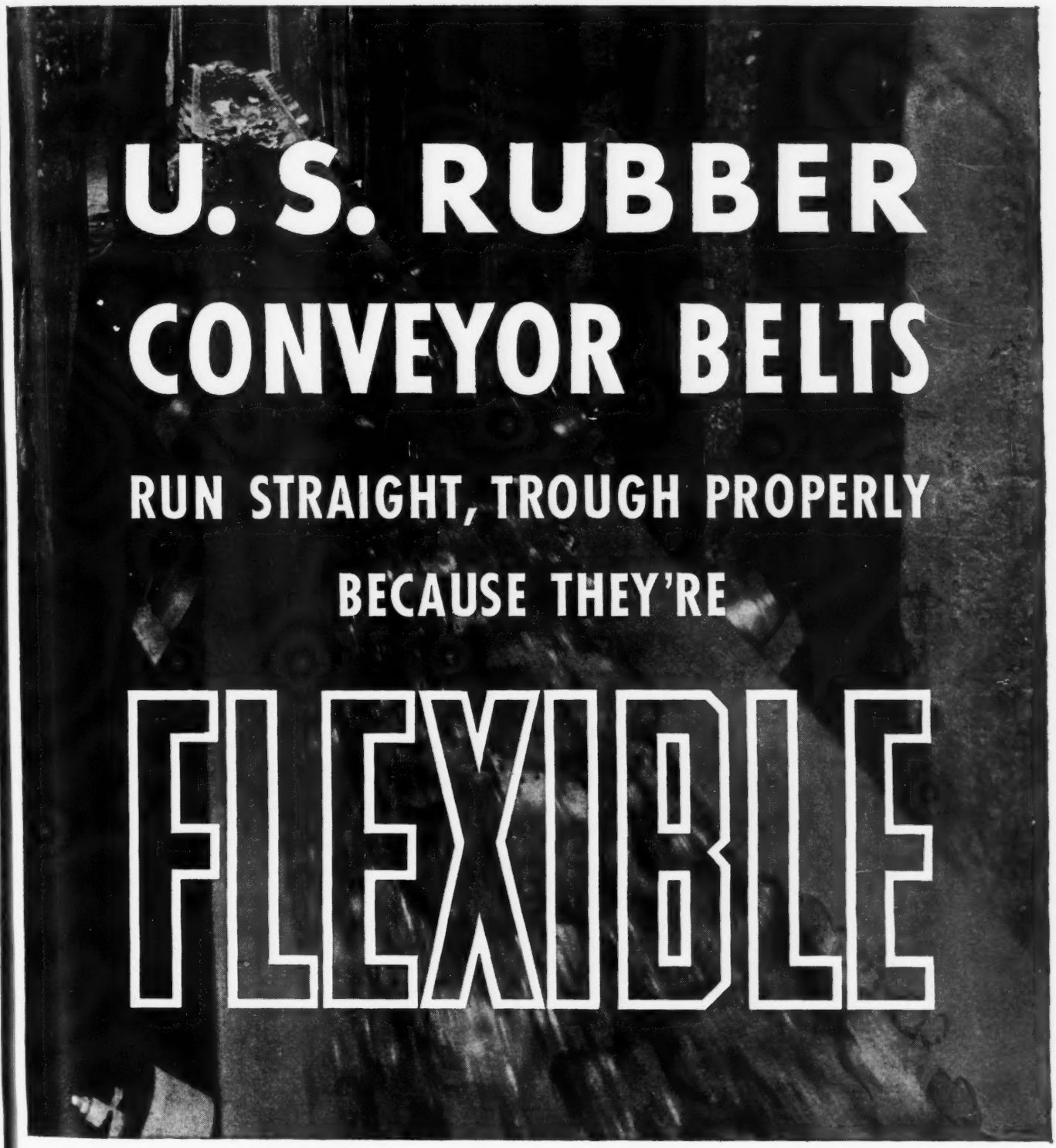
USING A POST-MOUNTED coal drill to provide roof hangers for supporting the line brattice is considered part of the normal face operation at Powhatan mine, writes Edward Fellabaum, Powhatan Point, Ohio.

"When set to drill the shot holes for each cut, the driller makes a hole in the roof about 12 in. deep and 2 or 3 ft. from the rib at an angle convenient to the position of the drill," as shown in the accompanying sketch. "Into this hole is driven a cap piece that has been chopped to wedge tightly in the hole.

"The square end of this cap piece is allowed to project about 4 in. below the roof and to this the brattice cloth is nailed. Inasmuch as these holes are kept in a straight line at a uniform distance from the transit, or 'sight,' line, and are drilled for every cut, the hanging of line brattice is made easy.

"At our mine," concludes Mr. Fellabaum, "we find that the small amount of time it takes to drill these holes is repaid several times over in that it provides an anchor for brattice cloth line that always is convenient and never in the way. As a result of this procedure, the air current is forced to do a better job of sweeping the face of every working place."





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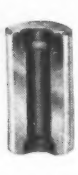

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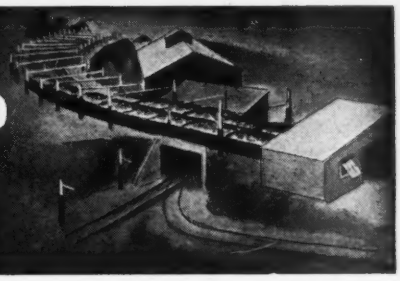
COAL AGE NEWS ROUND-UP



Coal Wage Agreement Approved by WLB

Presaging an early return of the majority of the anthracite and bituminous mines, the War Labor Board approved the bituminous agreement submitted five months ago by a vote of 10 to 2 on May 19, and on May 27 the Office of Price Administration announced new price schedules in accordance with the authorization of the approval of the anthracite wage agreement by the Director of Economic Stabilization May 26, thus removing the last stumbling block in the path of a reversion of the anthracite properties to their owners. The bituminous agreement was entered into by producers representing approximately 70 percent of the industry, and developments on May 27 indicated that an arrangement would be worked out between the Southern Coal Producers' Association and the United Mine Workers that would permit the southern producers to sign also and thus enable them to participate in the return of the properties.

In approving the bituminous agreement, WLB ruled that a difference of about 12 minutes between the travel time of 45 minutes assumed for the purposes of the agreement and the average of 57.29 minutes shown in the final report submitted May 25 by the Presidential committee appointed last year was "reasonably within the principles of its former decisions and consequently may now be approved for private operation of these mines." Terms and conditions of employment, providing for a basic rate of $8.50 per day for an 8½-hour day, including travel time and 15 minutes for lunch, were the same as those in the agreement signed by the government in 1943. WLB approval also carried with it affirmation of the provision for a $40 payment to each miner in settlement of portal-to-portal claims from April 1, 1943, to Nov. 3, 1943.

Early Mine Return Pledged

Following approval of the agreement, bituminous operators caucused in Washington May 25 and on May 26 representatives of the negotiating groups met with Dr. C. J. Potter, Deputy Coal Mines Administrator, to discuss matters relating to termination of government possession. With the exception of representatives of the southern producers, those attending expressed willingness to accept the agreement as approved by WLB and, it was announced, would go ahead with payment of the $40 portal-to-portal settlement without awaiting further OPA action on prices. The southern producers declared their willingness to make the contract effective in the South provided that such action would not deprive them of the right to continue their court test on their liability to pay for travel time. The Coal Mines Administration, it was stated, was committed to prompt return of the mines and expected to work out the program by June 1.

Conferences between the southern producers and the union got under way on May 27, and it was announced that a basis for accord had been reached that would not interfere with the court test on paying for travel time. Signing of an agreement on May 29 was stated to be a distinct possibility.

Anthracite Prices Settled

Ending differences of opinion over proper price increases which had held up return of the anthracite properties, OPA announced May 27 a new schedule which reduced the cut of 28c. per ton set for June 1 to an average of 14c. This action, which followed approval of the agreement by the Director of Economic Stabilization May 26, was taken because a "review of the industry's position had shown the need for a price adjustment in order that anthracite production might not be impaired." Dealers, including dock operators, however, were given additional time until June 10 to put the decrease into effect.

SAVE PAPER

Like steel and rubber, paper is needed in making material to win the war as well as for civilian requirements. As the supply gets scarcer the need for conserving it becomes more vital. Be as stingy in its use as you possibly can, making it stretch as far as possible. When it has served as many uses as it can be put to, salvage it for other war service. When you think of buying paper, buy War Bonds.

Store and Conserve, Consumers Warned

Warnings by the Solid Fuels Administration to store coal early and continuously against trying days expected next winter are still the order of the day. Consumers are besought not to be choosy, to take whatever can be had whenever it is available, but not to order more than their needs, so that all will get a fair share.

Must Use Bituminous Where Possible—Effective June 1, retail dealers outside the New England and Middle Atlantic States are forbidden to deliver anthracite or eastern coke to consumers whose equipment "reasonably permits the use of high-volatile bituminous coal," under amendments to government regulations announced May 23 by Solid Fuels Administrator Harold L. Ickes. The purpose of the changes, Mr. Ickes explained, is to assure adequate and equitable distribution of limited supplies of hard coal. The new rules include: Anthracite that is sold for industrial processes, power production or space heating incidental to such uses cannot be furnished by dealers in quantities greater than the consumer's requirements for 90 days from delivery, less inventory.

Public Urged to Buy Early—Immediate action must be taken by the public on three fronts to avoid widespread distress for lack of fuel next winter, SFA warned May 23. Consumers were advised to: (1) Store this summer whatever kind and quantity of fuel dealers could let them have. (2) Clean furnaces now and place heating equipment in good condition, install controls or other heat-saving devices if they are available. (3) Protect homes against loss of heat by installing insulation, storm doors, storm windows and weather stripping now.

Industrial Distribution Revised—Industrial bituminous coal distribution regulations have been revised by Secretary Ickes to conform to the supplies expected to be available in eastern and midwestern producing areas. The revisions tighten limitations on industrial purchases from two southern Appalachian producing districts (Nos. 7 and 8), where demand already far exceeds supply, and ease controls governing the remainder of eastern coals to encourage increased buying for stocking while the coal is available. The changes increase the number of consumers subject to the controls by requiring that all consumers of 10,000 tons or more of coal per

year, including those shipping by truck, be classified as industrial consumers. It also is required that persons receiving coal from commercial docks at retail up to 2,400 tons or more yearly file with their suppliers a report of their May 1 inventory so as to make possible equitable distribution of coal in accordance with SFA Regulation 21.

More Efficiency Coordinators Named—Appointment of 58 additional coordinators in the national fuel efficiency program was announced May 17 by Secretary Ickes as signed pledges of cooperation from scores of industrial executives in all parts of the country began coming in to the Bureau of Mines, Washington, D. C. Now totaling 76, the list of coordinators who will direct a staff of about 5,000 engineers—including some of the nation's foremost fuel experts—is expected to reach 300.

Permission for unrestricted movement of coal on the Great Lakes was extended to July 15 by the Office of Defense Transportation May 13.

May Charge for Coal Treatment—Treatment of bituminous coal with oil or a chemical to allay dust or prevent freezing may be charged for at 10c. per net ton if five specified conditions are met and if the producers are in District 2, 3, 7, 8, 9 or 13, OPA announced May 19. This compensation is provided for producers who did not render this service in the Oct. 1-15, 1941, based period and are now prepared to do so as well as for producers who were performing the service in the base period but were not charging for it. Producers who were rendering the service in the base period and charging for it then are permitted to make the same charge for it now.

Must Observe Equitable Distribution—Pointing out that SFA had opposed coupon rationing of coal as impracticable, Secretary Ickes called upon the retail coal industry May 5 to meet its responsibilities in equitably distributing the nation's limited coal supply during the forthcoming winter. He announced apointment of area advisory committees on local distribution in certain areas east of the Mississippi in which bituminous coal is the primary solid fuel consumed.

In a statement directed to retail coal dealers, Deputy Administrator Potter stressed May 2 the necessity for rigid adherence to the provisions of SFA Regulation 21, prohibiting dealers from delivering to any domestic user more than 75 percent of his next winter's supply of eastern coals prior to Oct. 1, in maintaining equitable distribution of scarce coals produced in the Appalachian fields.

Urges Use of Anthracite Fines—Secretary Ickes urged May 9 that retailers in Northeastern States tap the huge surplus of anthracite fine sizes as a source of additional tonnage this year. When mixed with bituminous coal, he pointed out, they can be utilized without loss of efficiency by commercial, semi-commerial and industrial consumers, thus helping to offset shortage in bituminous supply.

Need Not Cut Price as Much as Cost Saving—Producers need not reduce their maximum prices for coal briquets by the amount of the decrease in coal costs that results if they substitute anthracite fines for coal in manufacturing briquets, OPA announced May 12—Amendment 31 to Minimum Price Regulation 121. This will apply only to producers who prior to Nov. 23, 1943, used only bituminous coal in the making of briquets.

Union Pledges to Boost Anthracite Output—U.M.W. representatives from an area extending from Wilkes-Barre to a point north of Pittston, Pa., pledged their cooperation May 5 in a program to increase output in the Northern anthracite field sponsored by SFA. A meeting was planned for Scranton to spread the movement to the upper end of the field. Meantime Secretary Maize of the State Department of Mines petitioned Fuels Administrator Ickes for action aimed at liberalizing draft regulations to prevent further inroads on the manpower of the coal-mining industry. Secretary Maize said that hard-coal producers needed 16,250 more men, which would assure an increase of 12,279,000 tons over last year's output of anthracite.

•

A.F.L. Rejects U.M.W.; Petition Withdrawn

Willingness to readmit the United Mine Workers of America to the American Federation of Labor with the jurisdiction over coal miners which it had when its connection with the federation was severed seven years ago was reaffirmed at Philadelphia May 5 by the A.F.L. executive council, but John L. Lewis, U.M.W. president, shortly afterward withdrew the miners' application.

The council rejected by a vote of 9 to 4 a motion by William L. Hutcheson, president, United Brotherhood of Carpenters, to recognize the presence of the chemical workers in the U.M.W. and Mr. Lewis' right to bring them into the A.F.L. Despite the defeat of this motion, it was said that William Green, president, and George Meany, secretary-treasurer, had informed Lewis that the federation would not object to U.M.W. retaining chemical workers whose products were derived from coal and coke.

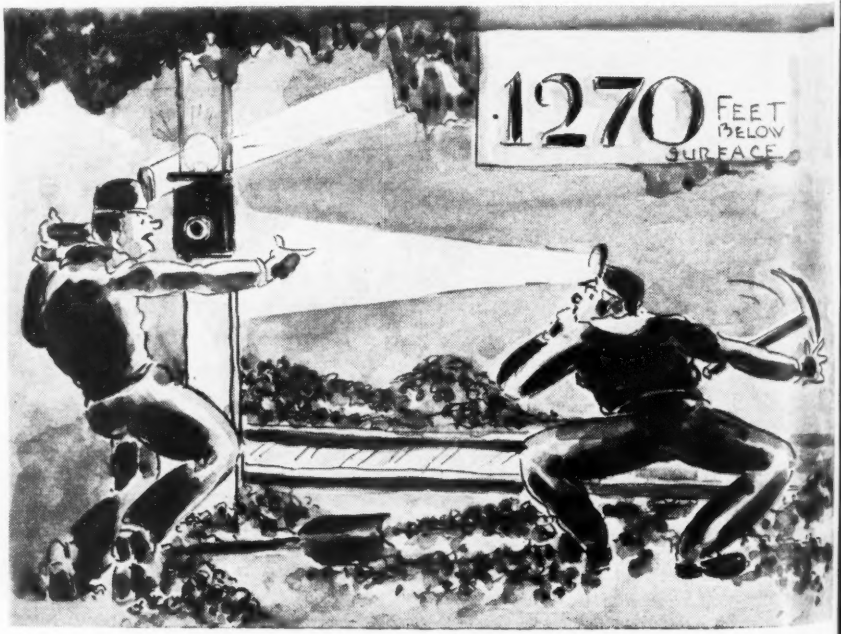
In an angry letter to President Green, May 8, Mr. Lewis withdrew his application for reinstatement in the A.F.L. and asked for immediate return of a $60,000 check for the first year's dues. Mr. Lewis denounced the failure of the A.F.L. executive council to act on the application as "characteristic servility to the Roosevelt administration," marking "dishonorable intrigue which had permitted the A.F.L. to become the puppet of a political organization and, in fact, to achieve the status of a political company union." He described the handling of the application for reaffiliation—filed May 17, 1943—as "an amazing exhibition of base hypocrisy approximating moral turpitude."

•

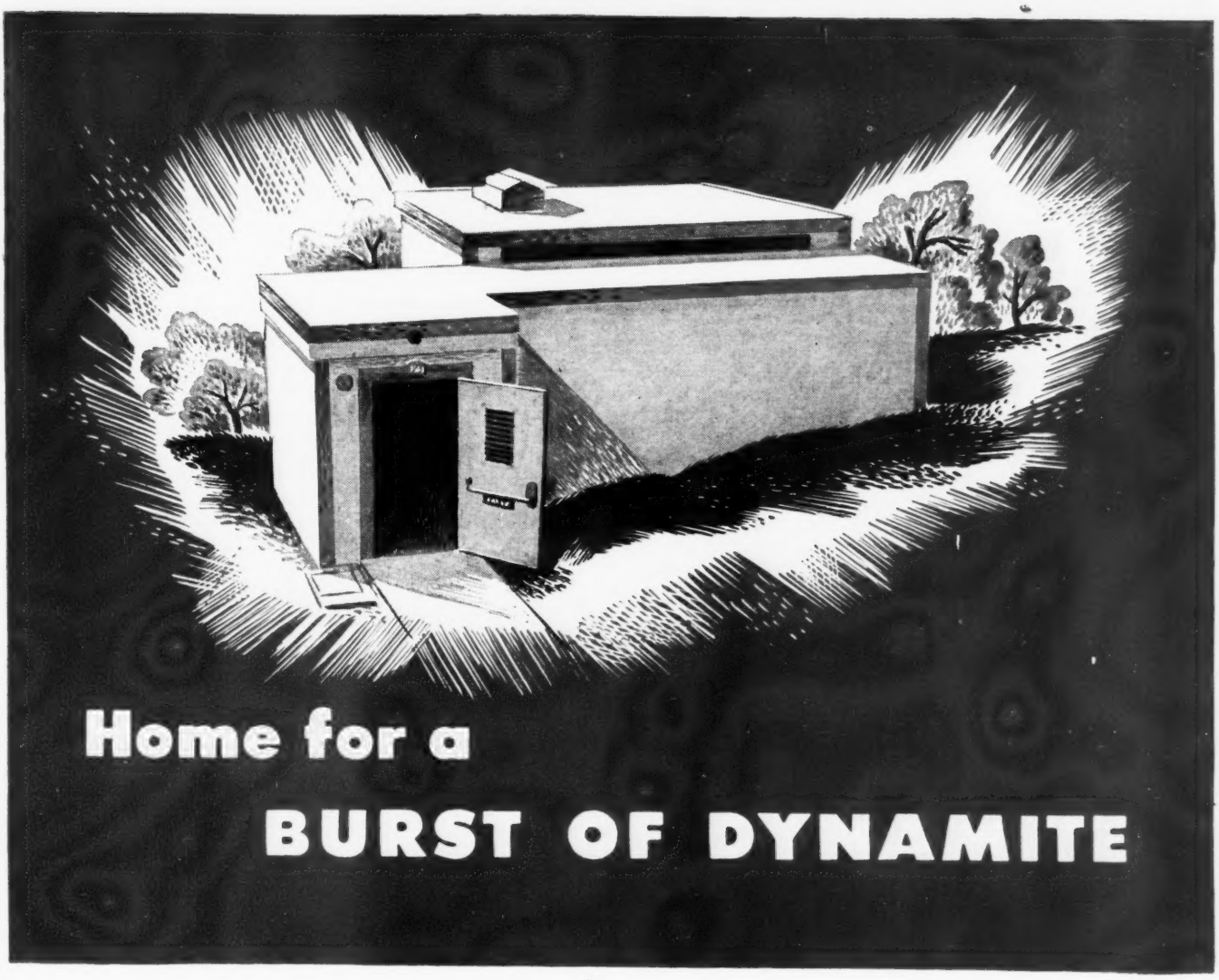
Plead No Contest In Anti-Trust Case

Twenty-nine anthractie producing companies and 26 of their officials pleaded no contest May 2 as they were about to go on trial in federal court in New York City charged with conspiracy to fix anthracite prices in violation of the Sherman Anti-Trust Act. The pleas were entered before Judge John C. Knox.

The defendants, stated to mine 80 percent of the nation's hard coal, are: Glen Alden Coal Co.-Delaware, Lackawanna & Western Coal Co.; Susquehanna Collieries Co.-M. A. Hanna Co., Pennsylvania Coal Co.-Pattison & Bowns, Inc., Lehigh Navigation Coal Co., Inc.; Philadelphia & Reading Coal & Iron Co., Lehigh Valley Coal Co.-Lehigh Valley Coal Sales Co., Hudson Coal Co., Cranberry Improvement



"Quick! Turn out your light! He says there's an air raid!"



Home for a BURST OF DYNAMITE

THIS BOMB-PROOF SHELTER is radically different from those on the war front. Here the "bombs" explode inside—set off by a remote control electric firing panel. A part of the hook-up is oscillographic equipment which permits the recording of firing times of various types of explosives.

Such experimental work, combined with field experience, contributes to the tremendous fund of knowledge which Hercules has accumulated over the years and is constantly enlarging for the benefit of the users of Hercules explosives everywhere.

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Also Sullivan Trail oal Co., Payne Coal Co., Inc.; Penn Anthracite Collieries Co., Pompey Coal Co., Russell Mining Co., Stevens Coal Co., Volpe Coal Co., William Penn Colliery Co., Jeddo-Highland Coal Co. and Weston Dodson & Co.

•

Employers-Men Share On Better Work Time

Employees and the company agreed to share responsibility for improved working time at Glen Alden Coal Co. collieries in the Northern anthracite field, under a pledge given April 27 to the Solid Fuels Administration by officers and mine committeemen of 15 United Mine Workers local unions. Edward Griffith, vice president and general manager of Glen Alden, said the fullest cooperation will be extended employees by the firm's supervisory personnel along lines suggested by SFA.

This action was taken at a meeting at the Hotel Sterling, Wilkes-Barre, sponsored by SFA, scheduled as the first in a series of region-wide meetings for the same purpose. John B. Gallagher, U.M.W. traveling auditor, presided and Edward J. Donohoe, assistant information director, SFA, was the principal speaker. He outlined the program to be launched with a test period during the first two weeks of May, arranged to convince the men of the possibilities of the plan.

•

Cleveland-Cliffs Buys Y. & O. Coal Land

A coal tract of 1,200 acres of coal land on the Pittsburgh or River coal seam in Greene County near Waynesburg, Pa., has been sold to the Cleveland-Cliffs Iron Co., operating the Mather Colleries, by the Youghiogheny & Ohio Coal Co. With this purchase Pickands, Mather & Co. has more than three thousand acres of coal land, which at its current rate of production is sufficient to keep the Mather mine in full operation for an estimated 35 years.

•

Correale to Have New Dragline

Correale Stripping & Construction Co., Hazleton, Pa., began erection of a new 1150-ton Bucyrus-Erie dragline shovel April 25 at the Beechwood stripping of the Philadelphia & Reading Coal & Iron Co., near Minersville, Pa. Construction also is in progress on a belt conveyor 3,000 ft. long which will deliver precleaned coal from this stripping to the company's Oak Hill breaker. The new stripper is to be in operation in August and will supplement a L5-W Bucyrus-Monighan, a 4161 Marion and a 381 Marion shovel now in operation.

Freight Rate Rises Again Suspended

Freight rate increases authorized March 2, 1942, in Ex Parte No. 148, which had been under suspension until July 1, 1944, have been continued under suspension until Jan. 1, 1945, in an order entered by the Interstate Commerce Commission. The Commission summarily dismissed a petition filed by the Association of Railroad and Utility Commissioners asking for permanent cancellation of the increases.

In seeking this cancellation A.R.U.C. cited 1943 railroad gross operating revenues of $9,054,000,000, the highest in railroad history. While conceding that there had been some decline in net operating revenues and in net operating income after taxes, the petition pointed out that with the exception of the month of December, 1943, where year-end accruals for retroactive wage awards produced the subnormal figure, the monthly declines under the preceding year seem to have become practically stabilized. The petition points to the fact that the higher freight rates were invoked originally as an emergency measure and states that "the practice of suspending the emergency increases from time to time creates uncertainty and instability in the economic life of the nation."

•

Supervisory Personnel Are "Employees"

Supervisory employees may not be discharged or otherwise discriminated against because they belong to an independent foremen's union, the National Labor Relations Board held in a decision May 8. The Board stated that "supervisors are 'employees' and that supervisory status does not by its own force remove an employee from the protection of Sec. 8 (1) and (3) of the Labor Relations Act." In the two cases at issue, the Board's regional directors refused to proceed on charges filed by the Foremen's Association of America. One case covered the Soss Mfg. Co., Detroit, and the other the Republic Steel Corp., Cleveland. Both cases involved alleged discharges of foremen because of their union activities.

Because of the general interest in the issue, the Board held a public hearing Feb. 15, 1944, at which numerous representatives of labor organizations and employer groups appeared and participated, including the National Coal Association, which submitted a brief supporting the contention that supervisory personnel are not employees but are, in effect, part of the management. All members of the Board concurred in the ruling.

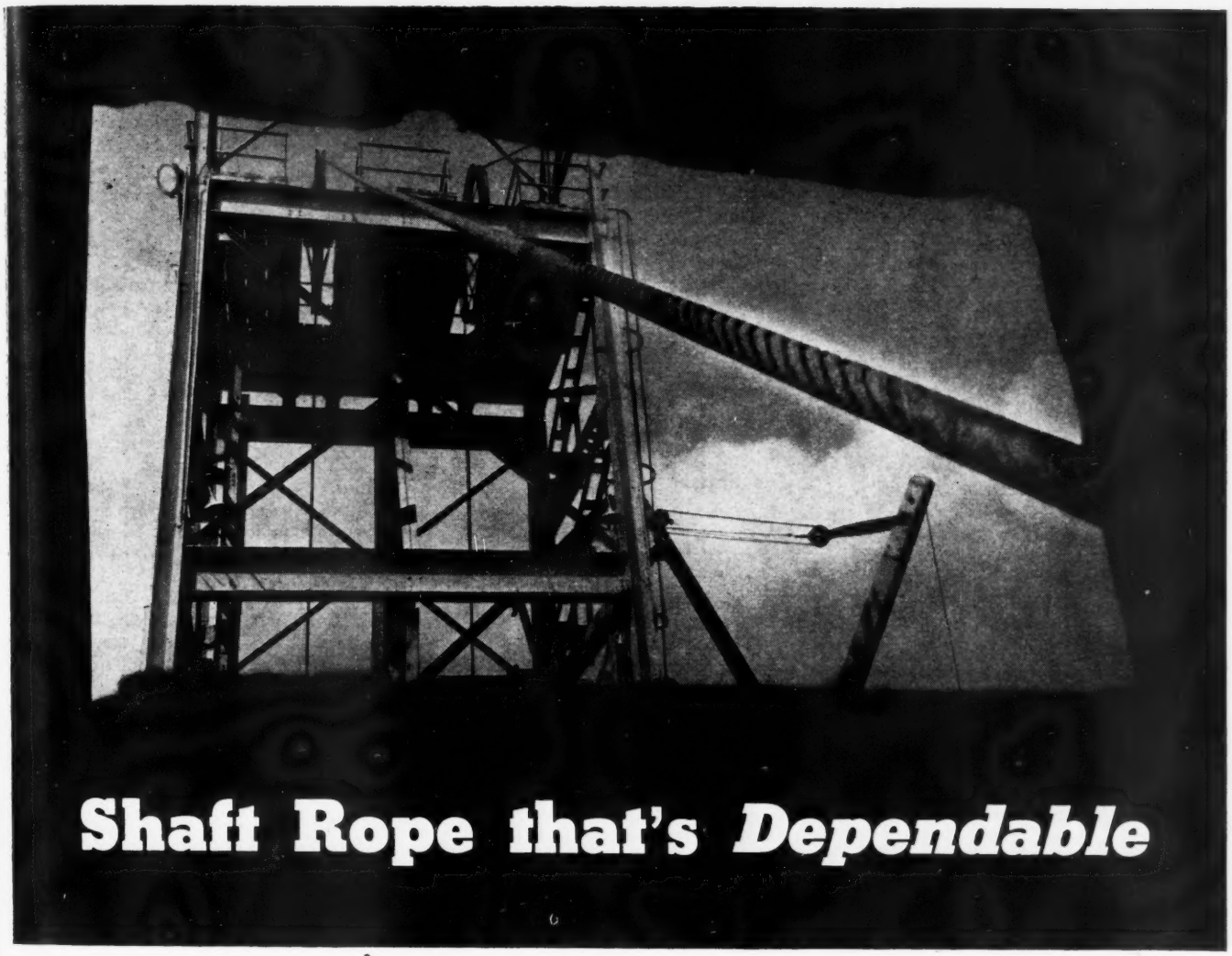
•

Funds Pledged For Soft-Coal Research

Plans for an expanded research program financed by the bituminous coal industry, with contributions from some of the coal-carrying railroads and allied interests looking toward new horizons for bituminous coal and its utilization in the post-war period have been consummated, according to H. N. Eavenson, president, Bituminous Coal Research. Pledges of financial support now in hand, covering a five-year period, he said, have passed $2,000,000, thus insuring full underwriting of the program and effectuating various participating agreements continugent on raising this sum.

Projects contemplated include enlargement of studies and experimentations previously carried on as well as new and dif-

"Oh, he was in a load of our coal last fall. Said he found it, dug it, loaded it and by durn, he was gonna burn it."



Shaft Rope that's *Dependable*

When you're choosing a mine-shaft rope, you know that there's no substitute for dependability. It's the No. 1 criterion—the assurance that a shaft rope will do the job for which it is built and intended.

That's why so many mining men are specifying Bethlehem wire rope for use in deep shafts. They know that they can have confidence in its dependability and long life, for big ropes of this type are a Bethlehem specialty . . . manufactured under close, skilled control all the way from the open hearth to the big-rope machines.

In these days when the uninterrupted service of mining ropes is an important factor in producing Victory tonnages, the advantages in choosing Bethlehem wire ropes need no underlining.

For Full Protection . . .
THE LAY-LOCK CLAMP—Weakest spot in mine hoists is the point where the rope is socketed or clipped to the cage. At this point a safety clamp is often fastened, connecting the rope to the cage with heavy chains. For this purpose, there's no more reliable fastening than Bethlehem's Lay-Lock Clamp. It can't slip, because its two halves contain zinc inserts molded to fit the rope with a vise-tight locking grip.

ferent problems pertaining to mining techniques, efficiencies in coal utilization and new uses for coal. The fund-raising campaign, which to a large extent was handled by E. R. Kaiser, assistant to the president of the research organization—an affiliate of the National Coal Association—will continue, with a view to enlisting additional support and to pave the way for still greater efforts in the field of research.

•

Keep Output High, Urges N.C.A. Group

Reviewing bituminous coal output for the first four months of 1944, the executive committee of the National Coal Association, at a meeting May 10 in New York, adopted a resolution congratulating the industry on its accomplishment in the face of heavy handicaps and urging that the production rate be maintained. The resolution follows:

"*Whereas*, Bituminous coal requirements for 1914 are estimated by the government at 620,000,000 tons, which is 31,000,000 tons more than was ever produced in one calendar year; and

"*Whereas*, the bituminous coal mining industry, responding to these requirements for coal to meet war needs of the nation, produced in the period Jan. 1 through May 6, 1944, a total of 222,805,000 tons of bituminous coal, which is 10,000,000 tons in excess of the amount produced for the same period in 1943, and more than was produced in any similar period in the nation's history; and

"*Whereas*, this record production was accomplished in the face of steadily increasing manpower shortage, scarcity of equipment and other difficulties growing out of the war situation; therefore be it

"*Resolved*, that the executive committee of the National Coal Association is of the opinion that this record is a source of justifiable pride on the part of those who work in the mines and those who manage them; that the committee extends its congratulations to the men and management of the mines and urges that every effort be put forth to the end that this record production may be continued, since anything short of record production will be inadequate to meet the needs of the nation at war."

President McConnell has named the following committee on government subsidies of competing energies: Grant Stauffer (chairman), president, Sinclair Coal Co., Kansas City, Mo.; W. J. Cunningham, president, Crummies Creek Coal Co., Crummies, Ky.; E. H. Davis, president, New York Coal Co., Columbus, Ohio; Charles Dorrance, president, West Virginia Coal & Coke Corp., Cincinnati; Milton H. Fies, vice president, DeBardeleben Coal Corp., Birmingham, Ala.; Brent Hart, president, Hart Coal Corp., Mortons Gap, Ky.; R. E. Jamison, vice president, Jamison Coal & Coke Co., Greensburg, Pa.; E. R. Keeler, president, Franklin County Coal Corp., Chicago; Hooper Love, president, West Kentucky Coal Co., Earlington, Ky.; R. H. Moore, president, A. C. Hughes & Co., Cresson, Pa.; D. H. Pape, president, Sheridan-Wyoming Coal Co., Monarch, Wyo.; W. J. Thompson, president, Colorado & Utah Coal Co., Denver.

The committee on employee relations includes the following: R. L. Ireland Jr. (chairman), president, Hanna Coal Co., Cleveland; W. L. Affelder, vice president, Hillman Coal & Coke Co., Pittsburgh; J. E. Butler, president, Stearns Coal & Lumber Co., Stearns, Ky.; L. Ebersole Gaines, president, New River Co., Mt. Hope, W. Va.; Carl T. Hayden, vice president, Sahara Coal Co., Chicago; Moroni Heiner, president, Utah Fuel Co., Salt Lake City; K. A. Spencer, president, Pittsburg & Midway Coal Mining Co., Kansas City, Mo.; Arthur B. Stewart, president, Davis Coal & Coke Co., Baltimore; L. E. Woods, president, Crystal Block Coal & Coke Co., Huntington, W. Va.

•

Portal Pay Review Asked by U.M.W.

The United Mine Workers of America asked the U. S. Supreme Court May 8 for an immediate review of a Western Virginia District Court decision of Jan. 25 that coal miners are not entitled under the Fair Labor Standards Act to underground travel pay. Previously the union had appealed the decision to the Fourth Federal Circuit Court.

Ordinarily such an appeal would be taken to the Supreme Court only after the Circuit Court had made its ruling. Counsel for the miners' union, however, wished to eliminate the time necessary for the Circuit Court to consider the case. The Supreme Court will make known soon whether it will permit the short cut.

•

Mine Fatalities Lower Than Year Ago

Accidents at coal mines of the United States caused the deaths of 99 bituminous and 12 anthracite miners in March last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

With a production of 54,330,000 net tons, the accident death rate among bituminous miners in March last was 1.82 per million tons, compared with 1.25 in the preceding month and 1.85 in March, 1943.

The anthracite fatality rate from accidents in March last was 2.15, based on an output of 5,573,000 tons, against 3.58 in the preceding month and 4.64 in the third month of 1943.

For the two industries combined, the accident fatality rate in March last was 1.85, compared with 1.48 in the preceding month and 2.12 in March a year earlier.

Fatalities during March last, by causes and states, as well as comparable rates for the first three months of 1943 and 1944, were as follows:

U. S. COAL-MINE FATALITIES IN MARCH, 1944, BY CAUSES AND STATES

State	Underground: Falls of Roof	Falls of Face	Haulage	Gas or Dust Explosions	Explosives	Electricity	Other Causes	Total Underground	Open-cut	Surface	Grand Total
Alabama	..	..	1	..	1	..	..	2	..	..	2
Colorado	1	1	1	..	..	..	..	3	..	..	3
Illinois	3	1	1	..	..	..	..	5	..	..	5
Indiana	..	..	..	..	2	..	..	2	..	..	2
Iowa	1	..	..	..	..	..	..	1	..	..	1
Kentucky	5	..	3	2	..	..	..	10	..	2	12
Maryland	1	..	..	..	..	..	..	1	..	..	1
Montana	..	..	1	..	..	..	..	1	..	..	1
North Dakota	..	..	..	..	..	..	..	..	1	..	1
Ohio	3	..	2	..	..	..	..	5	..	..	5
Pennsylvania (bituminous)	15	..	3	..	..	..	..	18	1	1	20
Tennessee	..	..	..	..	..	2	..	2	..	..	2
Utah	..	1	..	..	..	..	..	1	..	..	1
Virginia	3	..	1	..	..	..	..	4	..	..	4
West Virginia	13	..	3	16	..	2	1	35	..	2	37
Wyoming	2	..	..	..	..	..	..	2	..	..	2
Total bituminous	47	3	16	18	3	4	1	92	2	5	99
Pennsylvania (anthracite)	6	1	1	..	1	..	1	10	..	2	12
Grand total	53	4	17	18	4	4	2	102	2	7	111

DEATHS AND FATALITY RATES AT U. S. COAL MINES, BY CAUSES OF ACCIDENTS*

March, 1943 and 1944

Cause	Bituminous: Number Killed		Bituminous: Killed per Million Tons		Anthracite: Number Killed		Anthracite: Killed per Million Tons		Total: Number Killed		Total: Killed per Million Tons	
	1943	1944	1943	1944	1943	1944	1943	1944	1943	1944	1943	1944
Underground:												
Falls of roof and coal	171	141	1.117	0.876	23	25	1.490	1.517	194	166	1.151	0.936
Haulage	64	54	.418	.336	11	5	.712	.303	75	59	.445	.333
Gas or dust explosions:												
Local	4	....	.026	....	...	1	....	.061	4	1	.024	.006
Major	74	18	.484	.112	...	...	....	....	74	18	.439	.101
Explosives	14	4	.091	.025	3	6	.194	.364	17	10	.101	.056
Electricity	9	8	.059	.050	...	...	....	....	9	8	.053	.045
Machinery	7	7	.046	.043	...	...	....	....	7	7	.042	.040
Shaft	4	2	.026	.012	...	...	....	....	4	2	.024	.011
Miscellaneous	15	3	.098	.019	4	3	.259	.182	19	6	.113	.034
Stripping or open-cut	13	5	.085	.031	3	1	.194	.061	16	6	.095	.034
Surface	15	12	.098	.075	5	6	.324	.364	20	18	.118	.101
Total	390	254	2.548	1.579	49	47	3.173	2.852	439	301	2.605	1.697

* All figures subject to revision.

MORE THAN EVER YOU NEED Securityflex (BUNA)

...the Twin Parallel cable with these exclusive construction advantages

This cross-section shows Anaconda's twin parallel Securityflex cable with self-contained ground wire. This special cable has only slightly increased diameter, so that usual lengths may be handled on standard conductor reels. It offers a simple, convenient method for grounding loaders, conveyors, cutters, etc.

for example...

1. *Special D-shaped insulation* developed by Anaconda cable engineers. Prevents twisting. Impossible for one conductor to ride over the other and cause failures.
2. *Time-saving Breaker Strip* to separate the two conductors. Connections and splices can be made with greatest speed and ease.
3. Maximum flexibility . . . thanks to Anaconda Herringbone compensating construction.
4. Rugged Seine Twine reinforcement webbing for greater strength and to prevent tearing of jacket.
5. Buna jacket instead of rubber, as formerly —due to the wartime elimination of rubber in all mining cable. This fact, of course, *makes Securityflex construction features even more important than ever.* 44247

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not unless it is properly

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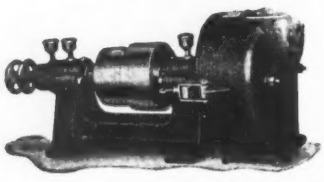
Unless your coal is properly graded and blended it will not meet the increasingly specialized requirements of industrial plants in the postwar era . . . it will lose out in the sharper SALES COMPETITION of tomorrow. That is why far-seeing modern collieries are equipping their laboratories with

STURTEVANT

Laboratory Equipment

Even with the manpower shortage—you can quickly get accurate coal samples—and save time, too. With the improved Sturtevant Automatic equipment you can crush and sample, at the rate of a ton an hour, save 32 operations, eliminate inaccuracy due to the human element, and get a far superior product for the Laboratory. Interested? Then write for Bulletin 85—"How to Sample Coal Automatically".

THE STURTEVANT FINE GRINDER



the Sample Grinder is of the "open-door" disc design, producing products as fine as 100 mesh (coarser, if desired) working on dry, friable, soft or moderately hard materials. Handwheel regulates output from 10 to 100 mesh. Will handle hard rock and ore at reduced capacities. Specifications and prices on request . . Bulletin 067.

BULLETINS . . . describing Sturtevant Laboratory Equipment upon request—and, if desire, we will be glad to submit constructive suggestions for increased and sustained postwar COAL SALES through modernized coal preparation.

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Water Board Outlaws Silt Pollution

The Pennsylvania State Sanitary Water Board has cracked down on further pollution of the Schuylkill River by outlawing the dumping of mine silt into streams. The Board has adopted a resolution removing the exemption in the 1937 Pure Stream Law, which heretofore has applied to silt from anthracite mines. An order is to be issued in June governing the engineering and operational features of plants and processes for removal of silt from mine water before it enters the streams.

Dr. A. H. Stewart, Secretary of Health and chairman of the Board, indicated that the requirements will be so drastic that they "will mean the removal of virtually all the settleable solids from mining operations."

•

United Electric Buys 35-Cu.Yd. Shovel

United Electric Coal Cos.' Fidelity mine, near Duquoin, Ill., has purchased a 35-cu.yd. Marion 5561 stripping shovel. It is not expected to be delivered until January, 1945. It will be the company's largest shovel, according to Superintendent Laurell, though matched by several in use in Indiana.

•

Cleaning-Loading Plant in Operation

A new cleaning and loading plant was put in operation at the Philadelphia & Reading Coal & Iron Co.'s Newkirk colliery, near Tamaqua, Pa., May 1. The plant provides facilities for precleaning, preliminary crushing and loading mine-run coal for shipment to central preparation plants of the company. Operation of this plant marked the introduction of a 150-cu.ft. all-steel mine car of somewhat new design equipped with automatic couplers.

Development of this operation was begun by the company in November, 1942, and included driving of 2,615 ft. of rock tunnel penetrating the North Dip measures of the Reevesdale Basin. Ultimate production from the operation is expected to be about 2,000 tons per day.

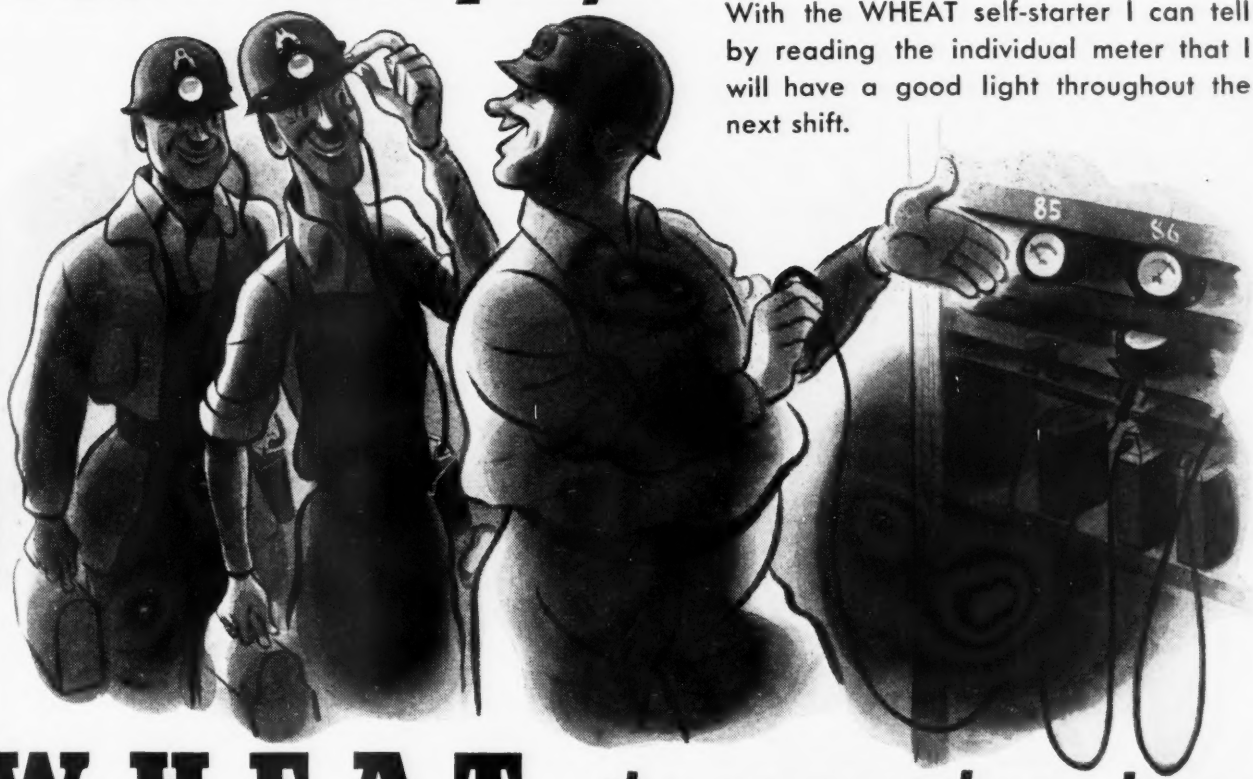
•

Rehabilitate Facilities At Raven Run

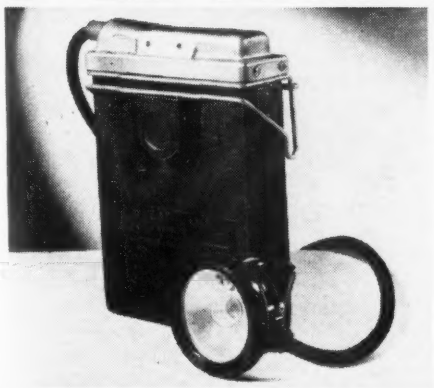
Rehabilitation of the anthracite property at Germantown colliery of the Raven Rum Coal Co., a subsidiary of the Jeddo-Highland Coal Co., Raven Run, Pa., undertaken during the last year, involved the construction of 3 miles of railroad track and restoration of the entire outside facilities, which had for the most part been removed or allowed to deteriorate.

Coal is brought to the cleaning plant by a double-track gunboat slope operating from the first level, which will be extensively used for main haulage, the lower

Tim Malloy *says..* I like to put my own lamp on charge. With the WHEAT self-starter I can tell by reading the individual meter that I will have a good light throughout the next shift.



WHEAT *the approved cap lamp*



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- Two bulbs (one for emergencies)—miner is never in the dark.
- Headpiece weighs less than 6 ounces, Lamp Cord 6 ounces, Battery 62 ounces—Total weight of Lamp complete, 74 ounces.
- Headpiece molded of strong bakelite, sealed, moisture-proof and dust-proof.
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- Lead-acid type battery maintains high voltage throughout shift (80+ percent efficiency)—year after year.
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- Designed for self-service charging system for lowest lamp-house operating cost.
- To charge, headpiece is simply slipped on to key in charging rack, and turned to make contact. Nothing to take apart—unit-sealed construction.

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SPECIALISTS IN MINE LIGHTING FOR 30 YEARS
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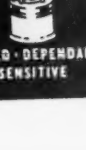

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Genuine Flexipipe is made of tough, specially woven fabrics, specially treated to resist gases, heat, fungus growth, acid and mine waters. It's compact, lightweight, easy to handle, economical. Available in three grades, to meet varying requirements.

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Please send literature on *Genuine Flexipipe*

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levels being developed by inside slopes. Development of the property, which is long and narrow and includes but one dip of the Mammoth vein, will require extensive use of rock haulageways.

Necessity of lowering the elevation of standing water in an adjoining mine brought about the use of turbine type deepwell pumps, permitting direct access to the standing water at the lowest possible discharge point and effecting a marked savings as compared with the conventional concealed pumping station.

•

Builds New Breaker

A tract of land between Carbondale and Forest City, Pa., formerly the Raymond colliery of the Scranton Coal Co., has been purchased by the Northwest Coal Co. The new owner has started construction of a new breaker equipped with a 12-ft. Chance cone, on the site of the former Raymond breaker, on the Ontario & Western R.R.

•

New Stripper Working

The Miller Clarkson Coal Co., Kansas City, Mo., has opened a new strip mine near St. Charles, in western Kentucky, on the Illinois Central R.R., and is now shipping coal. It has been operating since early in May and eventually will have a capacity of 20 to 25 cars a day. Several other new strip operations have been started in the western Kentucky field and several more are planned, as equipment of the contractors' type, especially used stuff, can be had, whereas regular mining machinery is very difficult to pick up. Several projects in the making probably will be announced soon.

•

Breaker Resumes

The Big Valley Coal Co.'s breaker, near Pottsville, Pa., long idle, is in operation again, shipping about 500 tons of anthracite per day. L. F. Stone, Buffalo, N. Y., has leased the structure from its former operators and expects to increase further the present volume of shipments. Mine-run for the breaker will be obtained from strippings in the Pottsville area. There also is said to be a possibility that the Randolph mine will be reopened to augment the tonnage.

•

Preparation Facilities

BLACK DIAMOND COAL CO., Luzerne, Pa.—Contract closed with Wilmot Engineering Co. for one Type D Wilmot Simplex jig to prepare pea coal; capacity, 20 t.p.h.

GLEN ALDEN COAL CO., Woodward Colliery, Kingston, Pa.—Contract closed with Wilmot Engineering Co. for one Wilmot 48-in. Hydroseparator to prepare egg coal; feed capacity, 40 t.p.h.

HOOVER COAL CO., Cressona, Pa.—Contract closed with Deister Concentrator Co. for three SuperDuty diagonal-deck

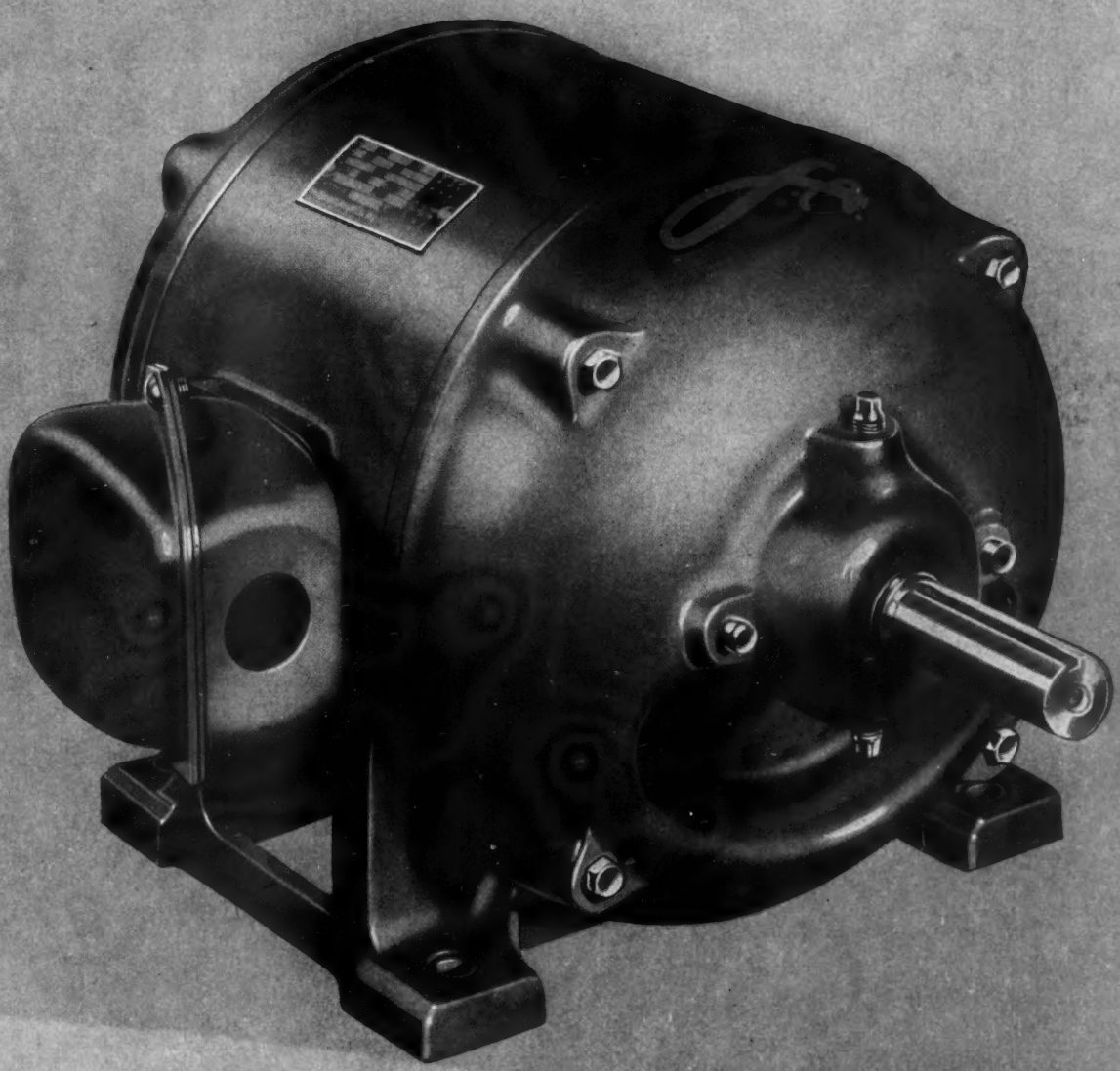
This is Not a New Motor

. . . *But* — this is the first time we have advertised our TYPE OG standard open squirrel cage motor.

These motors have been giving a splendid account of themselves in the war program for over two years.

A complete line is available—¾ to 100 HP in D.C. and ½ to 500 HP in A.C.

A copy of our new bulletin fully describing the quality features of TYPE OG motors will be sent upon request.



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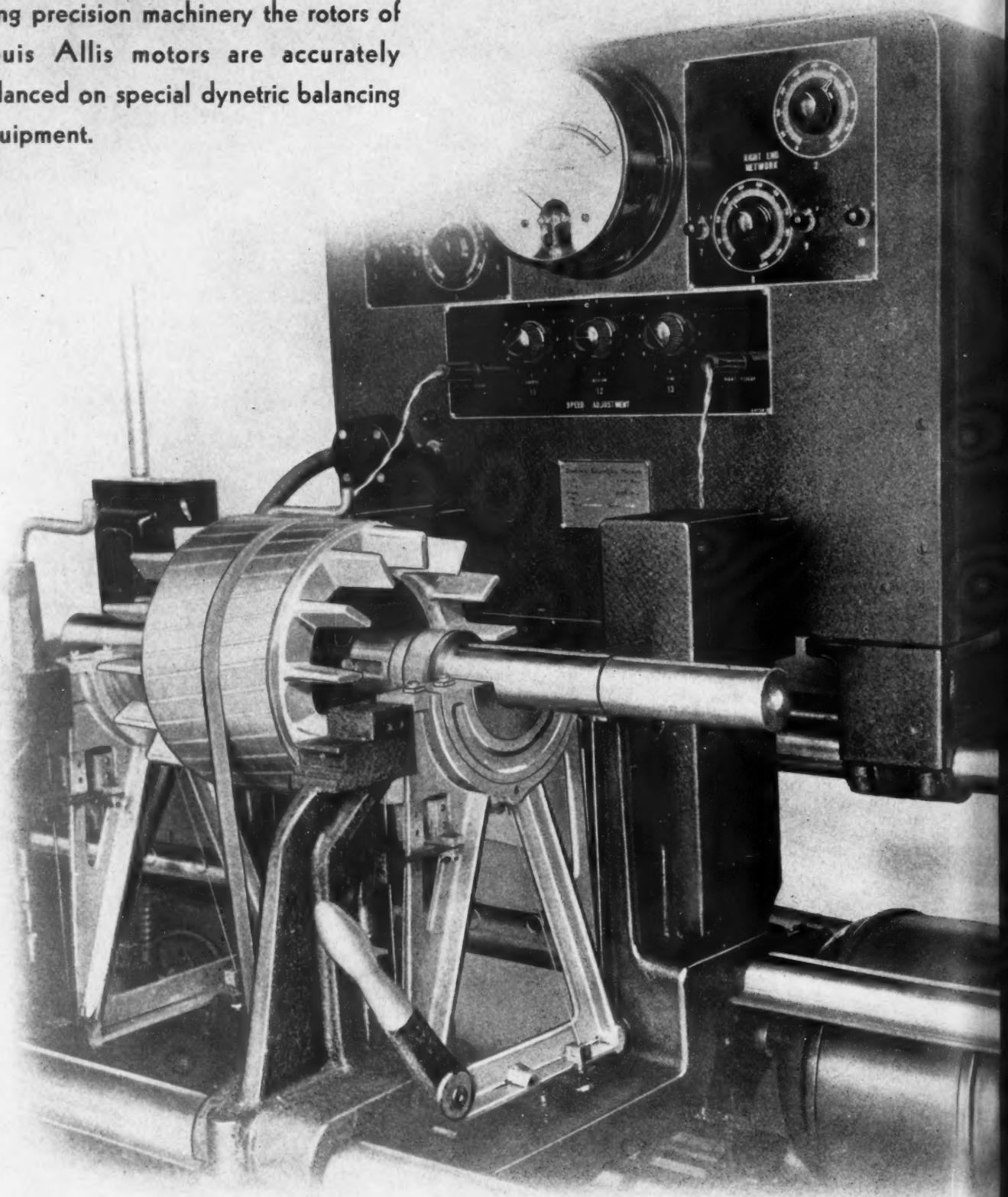
To assure the perfect mechanical balance that is required for smooth operating precision machinery the rotors of Louis Allis motors are accurately balanced on special dynetric balancing equipment.



THE LOUIS ALLIS CO., MILWAUKEE 7, WIS.

These Electric Blasting Caps Make Every Minute Count

Today, in the mining industry, man-hours are a vital commodity. War needs must be filled, and they require maximum production.

Dependable Du Pont Electric Blasting Caps help maintain high production schedules—because they reduce misfires to a minimum.

Du Pont Electric Blasting Caps are precision made . . . of the best materials . . . and by workmen skilled in their manufacture. They are equipped with an aluminum foil shielded shunt, which holds the entire length of the bared ends of the leg wires firmly together, forming a complete short circuit, and insulating the short-circuited ends from outside currents. The handy figure 8 coil eliminates tangling, kinking and snarling.

These outstanding features of dependability, safety, and ease of handling help make every minute count. Remember, *the safest detonator is the most dependable detonator.* Ask any Du Pont Technical Representative about Du Pont Electric Blasting Caps, or write E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington, Delaware.

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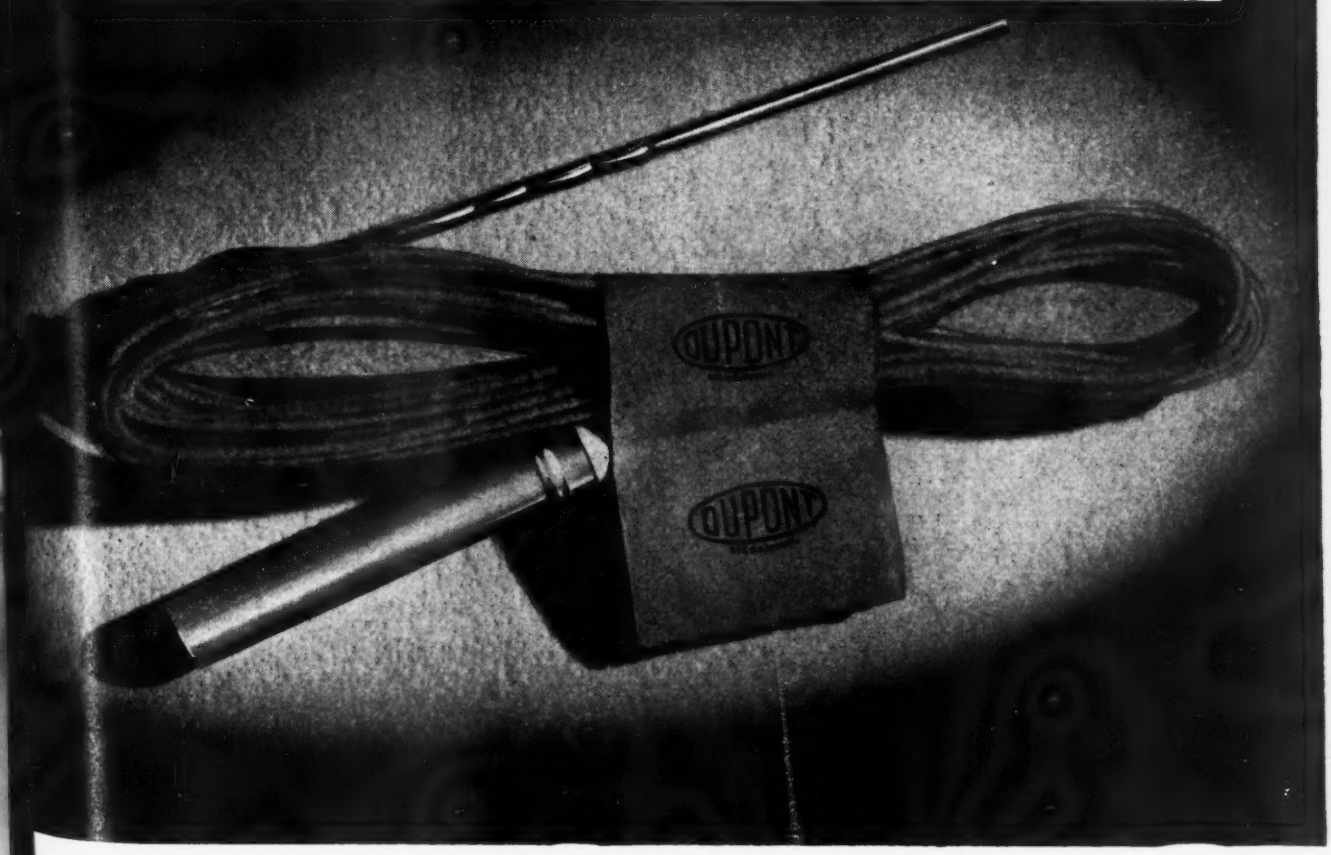

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COMPRESSOR CAPACITY
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It makes no difference what your power plant requirements for compressed air are, large or small, you will find that Schramm's compact air compressors will give you plenty of air . . . all you want . . . anywhere you want it in your plant! Schramm compressors give you these advantages: 100% watercooled to prevent freezing or overheating . . . mechanical intake valve operating from cam in perfect timing . . . larger discharge valve with lower lift adding to efficiency . . . furnished either for belt drive or "built-in" motor drive, assembled rigidly and in perfect alignment.
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No. 7 coal-washing tables to handle No. 4 buckwheat coal.

C. M. PEIFER, Dornsife, Pa.—Contract closed with Deister Concentrator Co. for one SuperDuty diagonal-deck No. 7 coal-washing table to handle No. 4 buckwheat coal.

RYON COAL CO., Pottsville, Pa.—Contract closed with Deister Concentrator Co. for one SuperDuty diagonal-deck No. 7 coal-washing table to handle No. 4 buckwheat coal.

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U. S. Mission to Scan British Coal Methods

An American coal mission composed of technicians and economists to confer with British Government and mining officials will soon be sent to Britain by the Combined Production and Resources Board, representing the war production agencies of the United States and Great Britain. The mission will study and report on tech

COAL ACTIVITY

Bituminous Coal Stocks

	Thousands Net Tons Apr. 1 1944	—P.C. Change— From Mar. 1 1944	From Apr. 1 1943
Electric power utilities	13,996	+0.6	-27.1
Byproduct coke ovens	6,281	-1.6	-36.2
Steel and rolling mills	765	.....	-31.7
Railroads (Class I)	9,894	+3.2	-18.5
Other industrials*	15,951	-3.5	-43.3
Total	46,887	-0.6	-33.4

Bituminous Coal Consumption

	Thousands Net Tons March 1944	—P.C. Change— From Feb. 1944	From March 1943
Electric power utilities	6,537	-2.3	+9.6
Byproduct coke ovens	8,124	+7.1	+6.2
Steel and rolling mills	1,020	+2.7	-2.5
Railroads (Class I)	12,045	+4.9	+3.0
Other industrials*	13,986	+2.8	+0.8
Total	41,712	+3.4	+0.5

* Includes beehive coke ovens, manufactured-gas plants and cement mills.

Bituminous Production

April, 1944, net tons	49,600,000	
P.c. change from April, 1943		+0.7
January-April, 1944, net tons	210,470,000	
P.c. change from Jan.-April, 1943		+3.9

Anthracite Production

April, 1944, net tons	5,202,000	
P.c. change from April, 1943		-2.0
January-April, 1944, net tons	21,685,000	
P.c. change from Jan.-April, 1943		+4.5

Sales, Domestic Stokers Vs. Oil Burners

	Stokers	Burners
March, 1944	1,688	2,270
P.c. change from Feb., 1944	+20.7	-28.9
P.c. change from March, 1943	-13.8	+22.0
Jan.-March, 1944	4,523	7,387
P.c. change from Jan.-March, 1943	-22.7	+34.3

Index of Business Activity*

Week ended May 20	240.0
Month earlier	241.3
Year earlier	234.0

**Business Week*, May 27.

Electric Power Output†

Week ended May 20, kw.-hr.	4,245,678,000
P.c. change from month earlier	-2.3
P.c. change from year earlier	+6.3

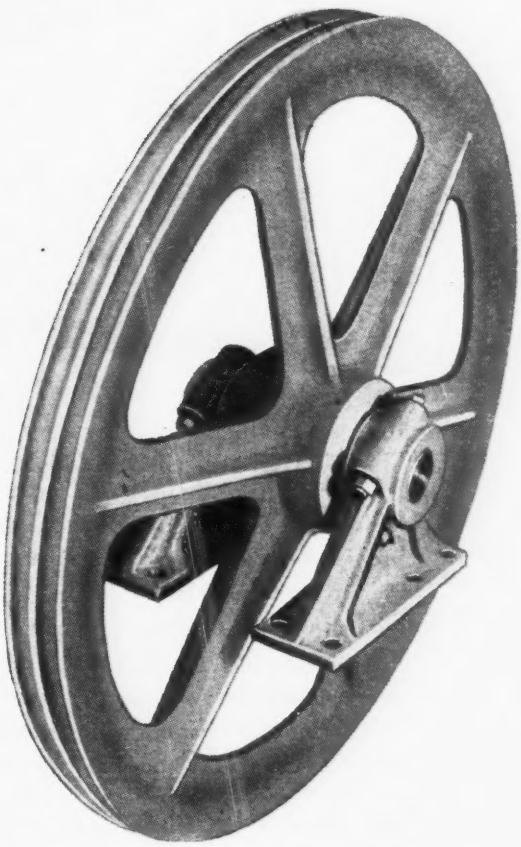
† Edison Electric Institute.

Three Points to Consider in Selecting SHEAVE WHEELS

1. Is the rim full machine turned in the groove for true running and saving of rope wear?
2. Are both Hub faces Machine turned for smooth, true running against the faces of the bearings?
3. Is the Wheel light, yet of strong section, to avoid undue bearing wear and to avoid high inertia which uses unnecessary power to start, stop and reverse?

HOLMES SHEAVE WHEELS are manufactured in both the bicycle type and the cast all-steel spoke type. Both are so designed to eliminate unnecessary weight yet exceedingly strong for long heavy-duty service. Holmes sheave wheels must pass the same rigid inspection as all other Holmes quality mining equipment before it is shipped.

Cast steel spoke wheels may be had for either single or double strand operation.



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DESIGNERS AND FABRICATORS OF MINING EQUIPMENT FOR OVER 70 YEARS.

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NAYLOR LIGHT-WEIGHT PIPE GIVES
YOU AIR . . . WHERE YOU WANT IT . . . WHEN YOU WANT IT

For ventilating jobs, you won't find a better vehicle for "shipping" air than Naylor Light-weight Pipe.

This pipe with the exclusive Lockseam Spiralweld structure provides performance advantages found in no other light-weight pipe. Greater strength. Leaktightness. Safety. And along with this plus performance you get advantages in pipe line construction that speed the job, save work, reduce maintenance and effect other economies right down the line. Furthermore, Naylor enables you to use lighter gauge pipe in larger diameters and you can install it where you want it.

Sizes from 4" to 30" in diameter—thickness from 14 to 8 gauge. All types of fittings, connections and fabrication.

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nical aspects of underground and strip mining in the United Kingdom, measures taken by the government to control the distribution of coal and conserve its use, and methods used in the compilation of coal statistics.

It is planned by the mission to determine the effectiveness of strip mining in Britain, now being undertaken in part with machinery sent from the United States. The extent of further needs of United States machinery and additional managerial and technical assistance in developing American mining methods in British coal areas also will be studied.

The mission, which will depart soon, consists of Arthur S. Knoizen (chairman), director, Mining Division, War Production Board; George A. Lamb, assistant director, U. S. Bureau of Mines; T. G. Gerow, vice president, Truax-Traer Coal Co., Chicago; Paul Weir, consulting engineer, Chicago; R. G. Lazelle, mining engineer, Holden, W. Va.; H. O. Rogers (secretary), economist, Combined Production and Resources Board; W. F. Hahman, Solid Fuels Administration; Richard H. Swallow, chief engineer, Ayrshire Patoka Collieries Corp., Indianapolis; and Carl T. Hayden, vice president, Sahara Coal Co., Chicago.

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A.I.M.E. Men Weigh Froth Flotation

Featured by a paper on froth flotation as applied to cleaning the small sizes of anthracite, by W. J. Parton, preparation engineer, Lehigh Navigation Coal Co., Lansford, Pa., the spring meeting of the American Institute of Mining and Metallurgical Engineers, held May 12 in Pottsville, Pa., attracted about 150 anthracite mining men. After much experimentation with a pilot plant L. N. C. is now building a commercial flotation plant with a capacity of 50 t.p.h. of the low-ash silt. Two results are expected from the new plant: an anthracite byproduct will be made marketable and the quantity of silt flowing into streams will be reduced.

The meeting was under the direction of Evan Evans, chairman of the Anthracite Section of the institute and vice president and general manager, Lehigh Navigation Coal Co.

•

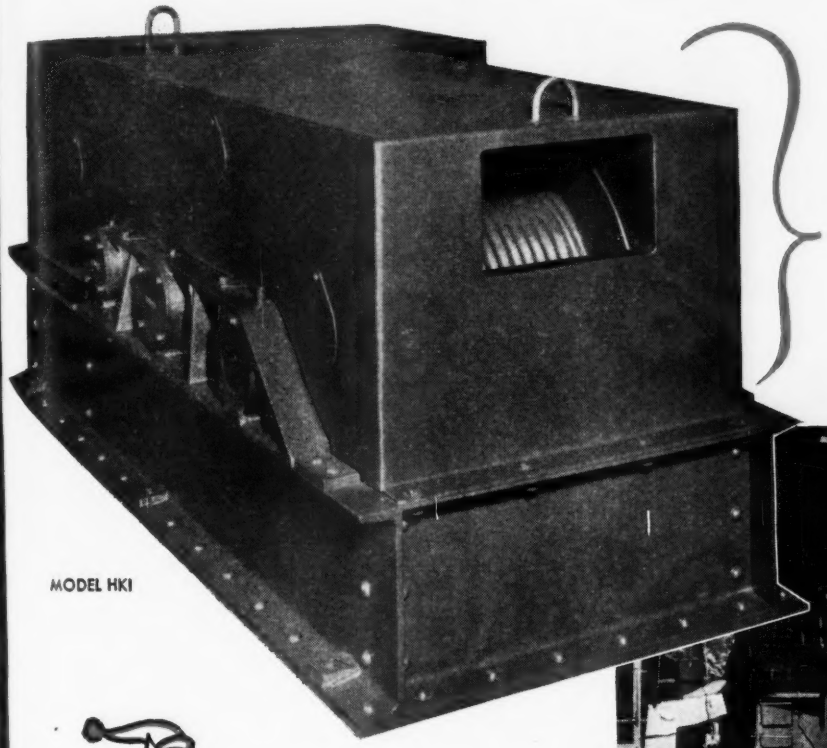
Seeks $150,000 For Coal Experiments

Federal funds to carry on laboratory and experimental work in the anthracite region of Pennsylvania have been requested by Representative Walter (R., Pa.). In hearings made public April 26 the Easton congressman asked the House appropriations subcommittee studying the Interior Department's 1945 appropriation to approve the expenditure of $150,000 for this purpose as a temporary measure because the anthracite laboratory authorized by the 77th Congress could not be built because of wartime building restrictions.

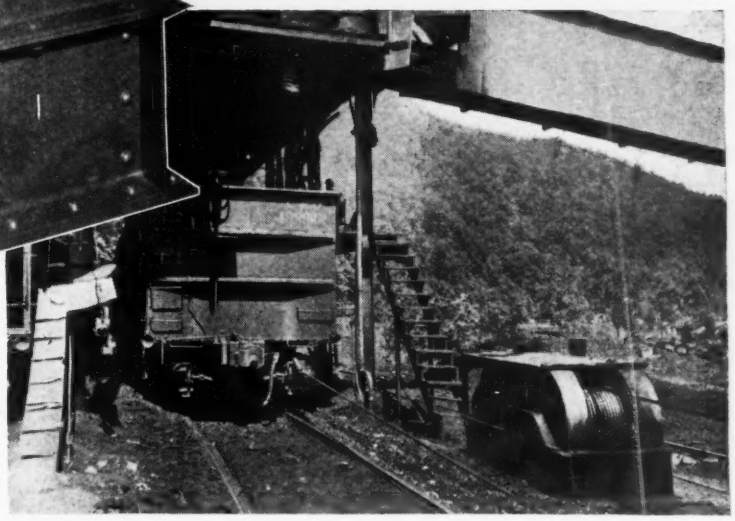
Representative Walter said the money could be spent during the year in a four-point study program to be conducted in

Brown-Fayro
LAYER LOADING HOISTS

Assure
UNIFORMITY OF PRODUCT



MODEL HKI



A typical Brown-Fayro Layer Loading Hoist installation

Model HKI Data

Model HKI layer loading hoist, illustrated above, is rated 24,000 *lbs. rope pull and is equipped with* 40 *HP motor and powerful thrustor operated brake. Drum capacity* 450 *ft.* 1⅛" *wire rope. It is completely controlled by push buttons located at the trimmer's platform.*

VARIATIONS in physical and chemical characteristics of coal from different sections of the same mine often make it difficult to maintain a satisfactory product when loading run-of-mine or metallurgical grades.

Layer loading obtains uniformity by placing in every car the proper amount of coal from each section of the mine. Several cars in tandem are shuttled past the loading point two or more times to obtain the degree of mixing desired.

"Brownie" layer loading hoists are an efficient means of moving the cars and help you in three ways:

(1) Prevent an excess of either desirable or inferior coal entering any single car.
(2) Prevent segregation of lumps from fines.
(3) Reduce degradation.

"Brownie" layer loading hoists are made in three ratings for handling two to seven railroad cars. Write for full data.

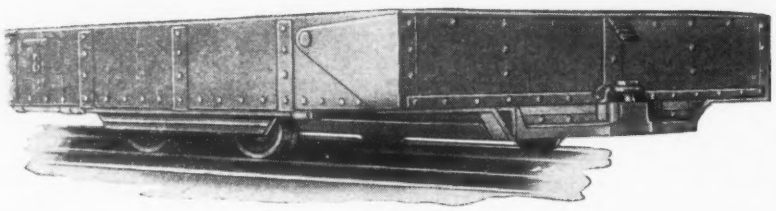
THE BROWN-FAYRO COMPANY
JOHNSTOWN, PENNA.

Steelcar

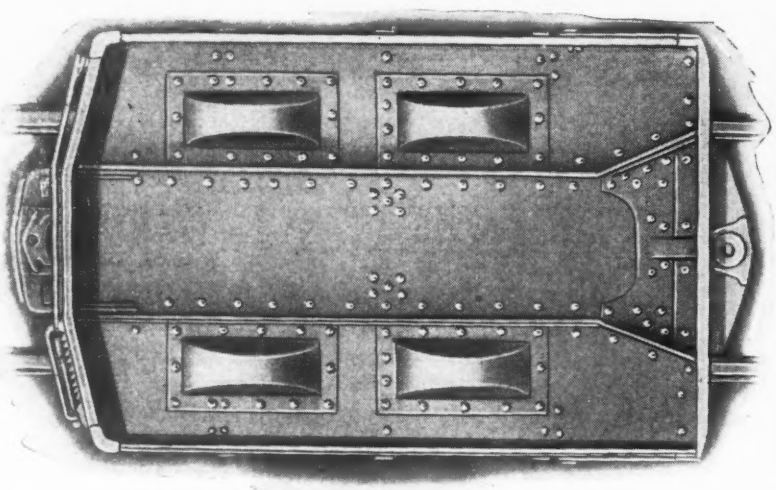
MODERN

STEEL COAL MINE CARS

BUILT TO MEET YOUR REQUIREMENTS



Modern, all-steel construction cars—designed to provide greater cubic capacity for your present clearances. Descriptive bulletin and complete specifications sent on request.



PRESSED STEEL CAR COMPANY, INC.
INDUSTRIAL DIVISION
PITTSBURGH, PA.

the laboratories and nearby mines of a college or university in the hard coal region, as follows:

Boost anthracite production by improving mining methods.

Prevent recurring mine floods by diverting small streams to new and safe channels; silt stream beds to prevent water from flowing into the ground; construct side-hill ditches to carry water past outcrops to streams; construct flumes across breaks in stream beds; prevent drainage of surface water into mines, and construct small flumes and tunnels to drain abandoned mines.

Find means of utilizing fine sizes of anthracite which the market is not now absorbing.

Study methods of preventing mine fires and of extinguishing them quickly.

The subcommittee was in general accord with the program, it reported, but, in the absence of a definite program from the Bureau of Mines, did not feel justified in taking favorable action.

•

Non-Miners Given 5-Percent Wage Rise

A 5-percent across-the-board pay increase to a handful of workers, awarded by the Fifth Regional War Labor Board at Cleveland paved the way for a move to place the wages of about 4,000 non-mining coal-company employees of West Virginia on a level with wages of the men who mine the coal. A voluntary request of the Boone County Coal Corp., Sharples, W. Va., for permission to give blanket 10-percent increases was reduced by the Board to the lower figure. Though only 27 workers—store clerks, bookkeepers, field men, stenographers and the like—were involved in the case, the ruling was viewed as the key to similar increases in the West Virginia fields.

The adjustments were made retroactive to Nov. 1, 1943, and the company was informed that the increases could not be used as a basis for seeking price increases "or resisting otherwise justifiable reductions in price ceilings."

•

U. S. Section of P.A.I.M.E.G. Forming

A national section of the Pan American Institute of Mining Engineering and Geology, designed to establish good-neighbor policies with respect to minerals on a firm basis, is being formed in the United States following a steering committee meeting April 17 in New York. At this meeting a national directorate was elected as follows: chairman, Edward Steidle, dean, School of Mineral Industries, Pennsylvania State College; vice chairman, C. W. Wright, chief foreign minerals specialist, U. S. Bureau of Mines; secretary-treasurer, A. T. Ward, mining engineer, New York City; directors—D. F. Hewett, in charge, section of metalliferous deposits, U. S. Bureau of Mines; M. B. Gentry, vice president, Freeport Sulphur Co.; T. T. Read, School of Mines,

YOU MEASURE LONG LIFE BY THE EDISON YARDSTICK

From the very beginning of *safe* light for the miner . . . ever since Thomas A. Edison perfected the first electric cap lamp . . . the EDISON name has stood for finer illumination, complete safety, *longer life* in service. Steel-strong, high-powered, beautifully engineered, the Edison Alkaline Battery sets a standard of trouble-free durability unique in mining operations throughout the world.

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BRADDOCK, THOMAS AND MEADE STS., PITTSBURGH 8, PA.
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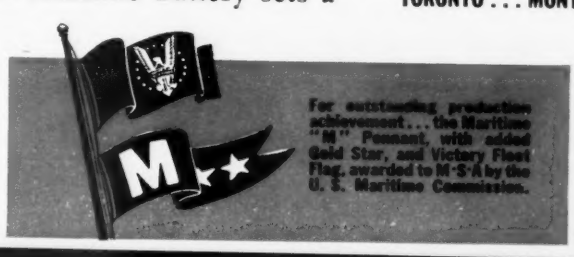
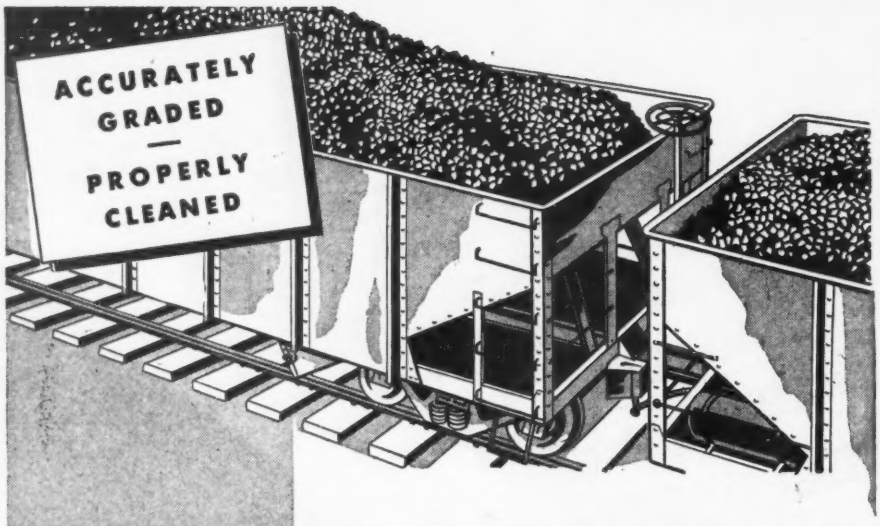
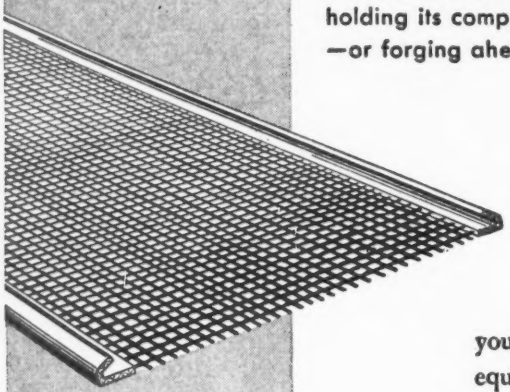

M
For outstanding production achievement . . . the Maritime "M" Pennant, with added Gold Star, and Victory Fleet Flag, awarded to M-S-A by the U. S. Maritime Commission.

MINE SAFETY APPLIANCES CO. · EFFICIENCY · SERVICE · SAFETY · PITTSBURGH PA.

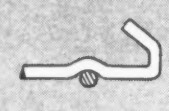


Coal that Meets the Modern Demand!

Does the coal you ship meet modern demands for proper preparation? If it does, your mine is holding its competitive position in the industry —or forging ahead.

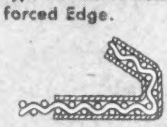


EDGE DETAILS SHOW TYPES AVAILABLE



Type 1: Turned Edge.

Type 2: Metal Reinforced Edge.



Type 3: Double Metal Reinforced Edge. (illustrated above).

Type 4: Square Bar.

One of the Ways

you can gain this advantage is to equip preparation plants with the right Roebling Vibrator Screens—made to order in the mesh size, wire diameter, and kind of wire that meets your needs exactly.

These screens are made in four types, as illustrated. Write today for descriptive folder on Roebling Woven Wire Fabrics, and order the type that will put your mine at the top of the scoring list for preparation.

Woven Wire Fabrics Division

JOHN A. ROEBLING'S SONS COMPANY

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Branches and Warehouses in Principal Cities

ROEBLING

PACEMAKER IN WIRE PRODUCTS

WIRE ROPE AND STRAND • FITTINGS • AERIAL WIRE ROPE SYSTEMS • SUSPENSION BRIDGES AND CABLES • COLD ROLLED STRIP • HIGH AND LOW CARBON ACID AND BASIC OPEN HEARTH STEELS • ROUND AND SHAPED WIRE • ELECTRICAL WIRES AND CABLES • WIRE CLOTH AND NETTING • AIRCORD, SWAGED TERMINALS AND ASSEMBLIES

Columbia University; W. E. Milligan, department of metallurgy, Yale University.

Members of any minerals industry society are eligible to join the new national section, and those paying 1944 dues of $5 (no initiation fee) before Dec. 31, 1944, will be recorded as charter members. Membership is based on willingness to aid in fostering good will and better understanding among mineral industries engineers and technologists in the Western Hemisphere. Anyone interested in becoming a charter member is requested to forward dues to Mr. Steidle, State College, Pa., or Mr. Ward, 50 Church St., New York City.

•

Coal Firms Sue For Mine Seizure Losses

Suit against the Federal Government to recover losses sustained during the period of government operation of the mines has been entered in the District Court of the United States for the Southern District of Iowa by the Pershing Fuel Co. and the Number Four Coal Co. Growing out of the first government seizure of the mines, the primary issue involved is the taking of the companies' funds and operating the mines at a loss.

In its answer in the Pershing Fuel Co. case the government states "that the Secretary of the Interior, on or about May 1, 1943, took temporary and nominal possession of the mine . . . together with any and all real and personal property, franchises, rights, facilities, funds and other assets used in connection with the operation of said mine and the distribution and sale of its products; . . . that said possession was temporary, nominal and supervisory in nature and limited to the extent deemed necessary by the Secretary of the Interior for the successful prosecution of the war; that defendant did not occupy or seize such property, or appropriate the same to its own use, or prevent the owners or operators thereof from deriving any and all benefits which would have accrued from said property in the absence of said possession.

"That the owners and operators of said property continued in actual and beneficial possession and managerial control thereof and continued as theretofore to retain all of the revenues therefrom and to expend them in their sole discretion, and were permitted to and did operate said property for their own account in the same manner as theretofore, according to their customary procedures and policies, utilizing the established and customary management and personnel. That defendant did not in any manner diminish the value of said property; that, on the contrary, such action as was taken by or on behalf of defendant was in connection with the maintenance of maximum production of coal in furtherance of the war effort, and resulted in the protection and enhancement of the value of said property. . . .

"That all action taken by the Secretary of the Interior or by or on behalf of defendant was a part of defendant's governmental regulatory function, essential to the successful prosecution of the war,

MACMILLAN RING-FREE WILL DO A BETTER LUBRICATING JOB

MAKE US PROVE IT!

MACMILLAN RING-FREE MOTOR OIL

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With a Record of

OUTSTANDING PERFORMANCE!

180% MORE FOOTAGE PER BIT!
53% LESS BIT COST PER FOOT!

This latest report from South America—drilling porphyritic rock formation—is another indication of the unprecedented savings and performance now being obtained with new-type Sinta-Set Bits for exploratory drilling.

Sinta-Set Bits can accomplish these outstanding results on your drilling also. Designed for drilling all formations, these bits contain high quality diamonds *throughout* a special tungsten carbide matrix (*not just on surface*). You get 90% diamond utilization, closer tolerances on inside and outside gages, uniform wear across kerf. No resettings required. Up to 3 times longer life.

Prompt deliveries of core bit sizes EX, AX, BX, NX. Casing bits also available. Write for catalog.

THE RECORD OF BITS SHOWN ABOVE

Bit No. 88-BC—Size EX

SIZES	START	FINISH	TOTAL WEAR
O.D.	1.472	1.440	.032
I.D.	.837	.861	.024
Length	1.885	1.740	.155

Bit No. 15-BQ—Size EX

SIZES	START	FINISH	TOTAL WEAR
O.D.	1.460	1.420	.040
I.D.	.835	.875	.060
Length	1.910	1.700	.210

CUT-AWAY SECTION OF NEW EX BIT SHOWING ORIGINAL MATRIX SIZE

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Christenson Diamond Products Co.
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WRITE FOR CATALOG

SINTA-SET
TRADEMARK DIAMOND CORE BIT

COMING MEETINGS

- **American Society of Mechanical Engineers: semi-annual meeting to discuss problems of industry, production, transportation and management—June 19-22, William Penn Hotel, Pittsburgh, Pa.**
- **American Society for Testing Materials: annual meeting, June 26-30, Waldorf-Astoria Hotel, New York City.**

and did not constitute a taking of said property for public use or otherwise entitled plaintiff to compensation from defendant. . . . As a separate defense, defendant alleges that if plaintiff sustained any losses during the period of government possession, said losses were the direct and proximate result of and were caused by the condition of the mining property, the market conditions for coal produced at the time . . . and the negligence, insufficiency and inattention of the plaintiff in the operation thereof."

•

B.C.I. Elects

New directors of the Bituminous Coal Institute, elected in Washington, D. C., April 12, met in New York City May 10 to organize and elect officers for 1944-45. Fred S. McConnell was elected president; J. P. Williams Jr., vice president; R. L. Ireland Jr., treasurer, and John D. Battle, secretary. Harry M. Vawter was renamed general manager to direct the institute's public relations campaign for the industry.

Directors of the institute decided to rotate the membership of the policy committee. Grant Stauffer and J. P. Williams Jr. were elected to serve on the committee for one year; Ralph E. Jamison and James D. Francis, for two years, and George W. Reed and R. L. Ireland Jr. for three years.

•

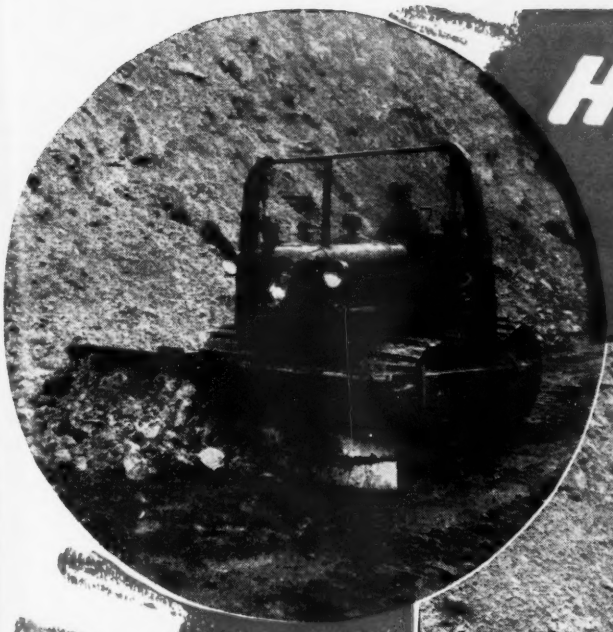
New Coal Lines

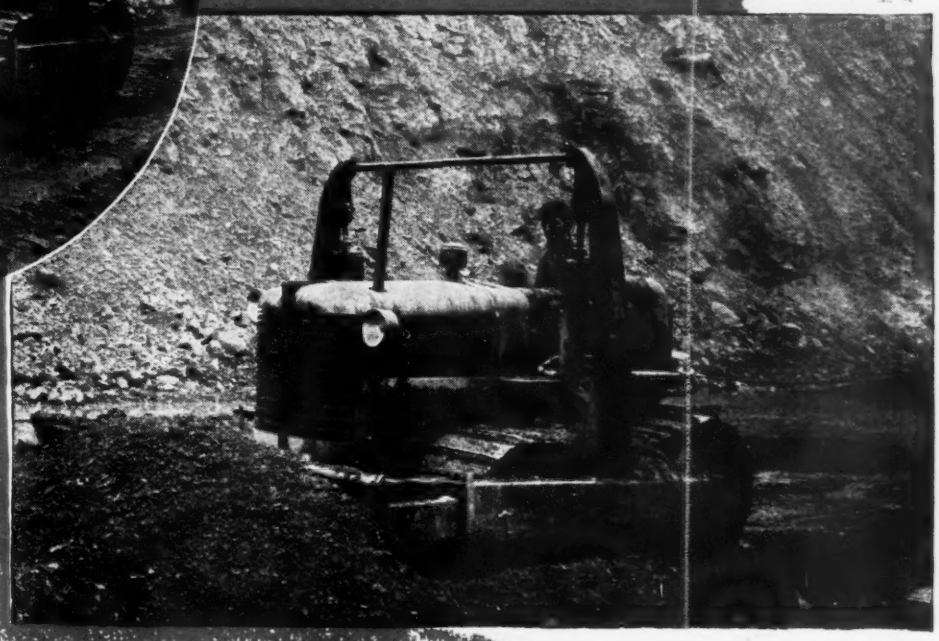
Considerable money is being spent by the Louisville & Nashville R.R. on new spurs and branches in Kentucky, which it is stated will immediately open 20,200 acres of coal land and eventually 50,200 acres more when extended. It is reported that roadbed is about completed and trackage will be installed in June on a 10 mile extension from Cornettsville into Perry County, in eastern Kentucky, opening 9,500 acres of coal, with 42,000 acres to be tapped later. Two extensions are being built by L. & N. in western Kentucky, one near Nortonville and another near Drakesboro.

The Chesapeake & Ohio Ry. has awarded a contract for construction of about 10 miles of road on a new branch line on the Levisa Fork of the Big Sandy River in eastern Kentucky. Being built to open a large acreage of undeveloped coal, it must be completed by January, 1945.

I.C.C. has approved part of an applica-

HANNA COAL USES BAKER BULLDOZERS





Two Baker Bulldozers mounted on HD-7 and HD-14 Allis-Chalmers Tractors helped produce 1,456,000 tons of coal at the Hanna Coal Company's No. 2 Mine at Georgetown, Harrison County, Ohio, last year. A number of additional Baker Bulldozers and Gradebuilders are used at Hanna's other operations.

Cleaning up floors and benches, building ramps and roadways, helping load the big strippers and doing out-of-range stripping and tree dozing are just a few time and labor saving jobs done with Bakers.

That they will be a big asset in helping to increase this mine's 1944 production to a 2,333,000 ton goal is a certainty.

Baker's exclusive hydraulic blade down pressure and rapid blade lift are the reasons for their preference by leading mining companies everywhere. Send for Catalog 839 and complete facts on how Bakers serve and save.

THE BAKER MFG. CO.
514 Stanford Ave., Springfield, Ill.

If it concerns Victory, it concerns us!

BULLDOZERS SNOW PLOWS **BAKER** CONSTRUCTION EQUIPMENT

HOLD THAT LINE WITH A
"FIST-GRIP"
1. have 4 bearing surfaces for full rope efficiency.
2. do the job better with fewer clips.
3. keep rope straight and in good condition.
4. are easier, faster, safer to install.
5. save time, tools, and money.
LAUGHLIN SAFETY CLIPS
...NOT WITH A
"FINGER-PINCH"
1. lack bearing surfaces necessary for full rope efficiency.
2. waste clips.
3. crimp and bend rope.
4. go on harder because of adjoining nuts.
5. waste time, tools, money.
ORDINARY U-BOLT CLIPS

UNIQUE-DESIGN CLIPS PRESERVE WIRE ROPE

Laughlin "Fist-Grip" Safety Clips work like automobile brakes; the more frictional surface, the less pressure necessary to do the job.

Laughlin Safety Clips have identical saddles and flat sides to hold the rope firmly and securely by friction without crushing it. Identical saddles fit snugly against the "live" and "dead" ends. Four bearing surfaces deliver full rope power with fewer clips.

Compare their design with that of U-bolt clips with their single bearing surfaces. Notice U-shaped bolt must be tightly drawn against "dead" end, forcing the "live" end into saddle. It has little frictional surface but does its work by burying its rounded surface into the rope, kinking or crimping the wires.

Use the clips that are kind to your rope. Why chance accidents or damage to your ropes? Laughlin Safety Clips are fool-proof. Get complete details in descriptive folder.

Distributed through Mill, Mine and Oil Field Supply Houses

FORGING A SHARE IN VICTORY

THE THOMAS LAUGHLIN Company

PORTLAND 6, MAINE

tion of the Baltimore & Ohio R.R. involving construction of a 7.62-mile line between Donaldson and Johnson Run, Webster County, W. Va. At the same time the Commission denied authority to continue the construction beyond Johnson Run to the three forks of Williams River (about 2.01 miles), the denial being without prejudice to later filing of a new application by the B. & O.

•

Cleaning Equipment For Westwood

Contract has been placed and construction begun by the Stevens Coal Co. on the installation of Chance cleaning equipment in the Westwood breaker, near Tremont, Pa., which is being operated under lease from the Philadelphia & Reading Coal & Iron Co. Production of coal through the new facilities is expected to begin about Aug. 1.

•

Coal Publications

The Hydrogenation of Coal at High Temperatures (Report No. 1), by J. R. Bray and R. E. Howard. Engineering Bulletin, Purdue University, Research Series No 90. 55 pp.; 6x9 in.; paper. Price, 25c. The higher the pressures of carbonization, the more complete the reaction. In early stages, ethane and higher hydrocarbons reach a maximum, but then drop off toward zero.

The Oxy-Acetylene Handbook, a manual on oxyacetylene welding and cutting procedure. The Linde Air Products Co.; 586 pp., 6x9½ in.; cloth. Price, $1.50.

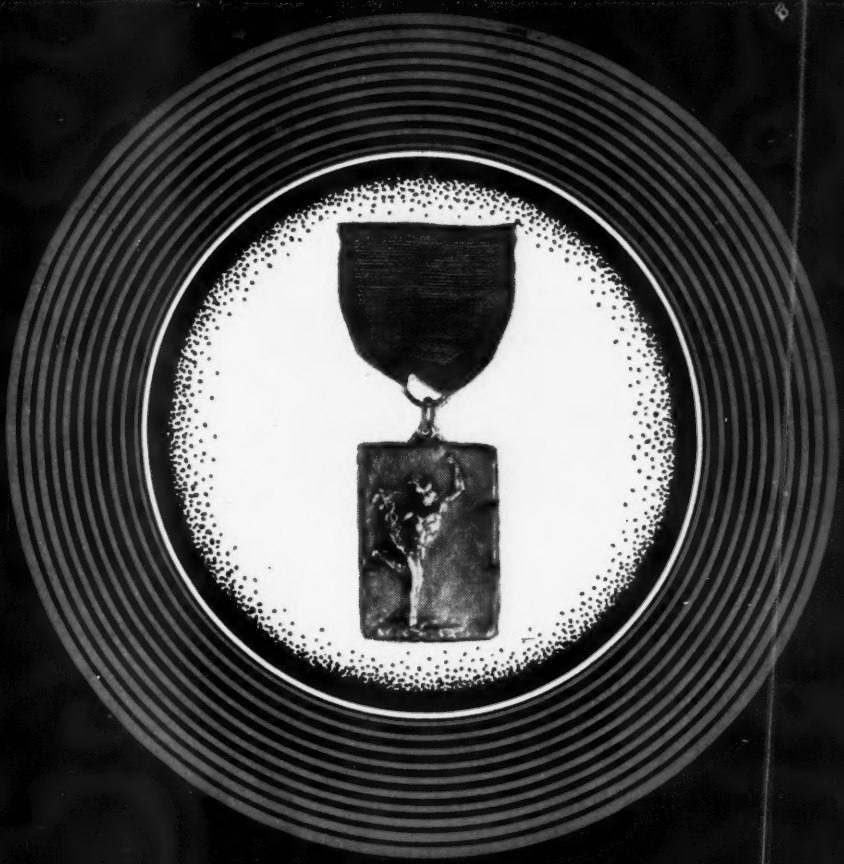
Sawards Annual, 1944, by Ralph B. Saward, Sawards Journal. 198 pp., 5½x7¾ in.; cloth. Price, $3.50.

The Mining Industries, 1899-1939: A Study of Output, Employment and Productivity, by H. Burger and S. H. Schurr, National Bureau of Economic Research, New York. 452 pp., 6x9½ in.; cloth. Price, $3.

Coal Carbonization: Carbonizing Properties of Medium-Volatile Coals of Various Types, by D. A. Reynolds and J. D. Davies, U. S. Bureau of Mines. R.I. 3749, 8 pp.; mimeograph. Splint and cannel make plastic coal more fluid and reduce cohesion so much that the volatile products can escape. Some carbonizing properties of medium-volatile coal cannot be predicted from chemical analysis, and external appearances may be a better clew than has been recognized generally.

Coal-Mine Explosions and Coal- and Metal-Mine Fires in the United States During the Fiscal Year Ended June 30, 1943, by D. Harrington and W. J. Fene, U. S. Bureau of Mines. I.C. 7274, 27 pp.; 8x10½ in.; mimeograph; paper. During the last five years, more men were killed by mine explosions than died from the same cause during the preceding eight years combined.

Iowa Geological Survey, Vol. XXXVIII, Annual Reports 1940 and 1941, State of



INTEREST BEFORE DIVIDENDS

Before a better mouse-trap can draw the world to its maker's door, many conditions must be met.

At the very beginning, the mouse-trap maker must have broad practical experience in order to develop a truly better product. Then a body of workers must be trained to maintain production in volume to equal demand. And finally—but of first importance—the interest of those workers in producing only quality mouse-traps must be encouraged.

Here at Thermoid, that employee interest in work well done receives constant stimulus from honor awards like the "Progress Medal" pictured above. From department heads to messenger girls, every Thermoid worker knows that sufficiently improved effort brings both official recognition and the applause of associates.

More important still, these honors emphasize the fact that protection of Thermoid's leadership depends upon the individual employee; and that the worker's own welfare rests directly upon continuance of that Thermoid prestige in the minds of customers and users of Thermoid Products.

This "mind to work" which marks the Thermoid family is among our most valued assets. It is largely responsible for the quality products, prompt customer attention and other things that cause folks to say: "It's good business to do business with Thermoid."

THE THERMOID LINES INCLUDE: TRANSMISSION BELTING • F. H. P. AND MULTIPLE V-BELTS AND DRIVES • CONVEYOR BELTING • ELEVATOR BELTING • WRAPPED AND MOLDED HOSE • SHEET PACKINGS • INDUSTRIAL BRAKE LININGS AND FRICTION PRODUCTS • MOLDED HARD RUBBER AND PLASTIC PRODUCTS.

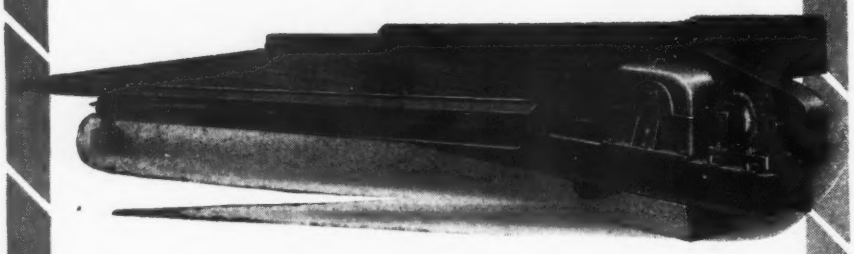
Thermoid Rubber

DON'T PUT IT OFF 'TIL TOMORROW
Buy More War Bonds Today!

DIVISION OF THERMOID COMPANY
TRENTON, NEW JERSEY

It's Good Business to do Business with Thermoid

SuperDuty Licks the Tough Coal Washing Problems



Many coal mine operators have solved their tough coal washing problems by installing SuperDuty Diagonal Deck Coal Washing Tables. SuperDuty Tables have proved that they deliver maximum recoveries, save hours of critical time and labor, and greatly increase the daily output of marketable coal.

Don't waste time worrying over coal washing problems—let SuperDuty solve them for you. The 38 years of engineering "Know-How" back of every SuperDuty Table means more profits and faster marketable coal production for you. Write or wire for descriptive bulletin No. 119A and complete details.

THE DEISTER ★
CONCENTRATOR
COMPANY
909 Glasgow Ave. • Fort Wayne, Ind., U.S.A.
CONCENCO PRODUCTS

★ *The ORIGINAL Deister Company • Inc. 1906*

Iowa; 453 pp., 7⅞x10½ in.; cloth. Nine pages on coal production; Pleistocene and Cambrian geology, ceramic materials and mineral production in Iowa are other matters treated.

•

Correcting the Record

As a result of a typographical error, the wrong voltage figure was used in that part of the report of the New River & Winding Gulf Electrical & Mechanical Institute (May Coal Age, p. 116) dealing with T. J. Jackson's discussion of voltage to ground with 440-volt Y-connected transformers and neutral ground. Instead of "356," the correct figure is "256," and the report should read: "With 440 volts from Y-connected transformers and the neutral grounded, the voltage to ground is 256."

•

Personal Notes

PAUL STERLING, mechanical engineer, Lehigh Valley Coal Co., with which he has been associated for 40 years, has been promoted to planning engineer.

EDGAR SCHWEITZER, fuel engineer, Lehigh Valley Coal Co., with which he has been associated since 1909, has been promoted to mechanical engineer, vice Paul Sterling, promoted.

CHARLES D. RUBERT, Lehigh Navigation Coal Co.; E. A. Reilly, Philadelphia & Reading Coal & Iron Co.; C. A. Garner, Jeddo-Highland Co.; James Hannigan, Glen Alden Coal Co., and H. H. Shaver, Hudson Coal Co., have been appointed as a permanent advisory committee on standard anthracite specifications, the Anthracite Committee announces.

ROY A. ISON, for the last two years mining engineer with the Red Jacket Coal Corp., Red Jacket, W. Va., has moved to Pikeville, Ky., where he has opened an engineering office to serve the coal industry. At one time he was district engineer for the Consolidation Coal Co.

GENE H. UTTERBACK, production engineer, Enos Coal Mining Co., Oakland City, Ind., left that company May 15 to act as technical adviser on drilling and

EQUIPMENT APPROVALS

Three approvals of permissible equipment were issued by the U. S. Bureau of Mines in April, as follows:

Joy Mfg. Co.—Type T2-5P mining-machine truck for foreign service; two 3-hp. motors, 440, 500, 550 or 625 volts, a.c.; Approval 501A; April 14.

Sullivan Mchy. Co.—Type WK-30 self-propelled air compressor; 30-hp. motor, 230 and 550 volts, d.c.; Approvals 502 and 502A; April 14.

Ohio Brass Co.—Type LG distribution box; three branch circuits; 250 and 550 volts, d.c.; Approvals 503 and 503A; April 21.

What do you want in a pump?

MAXIMUM COMPACTNESS?

Pomonas require as little as one-fifth the floor space of other-type pumps of comparable capacity . . . a BIG saving wherever space is a factor!

FOOL-PROOF OPERATION?

Pomonas require no priming—a feature that not only eliminates complicated priming equipment, but also permits fully automatic operation from remote locations without risk of pump damage!

TROUBLE-FREE SERVICE?

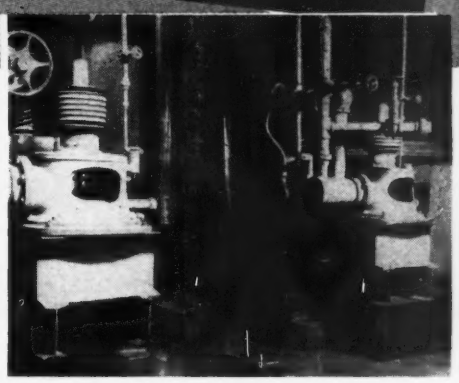
In Pomonas ALL bearings below the motor head are lubricated by the water being pumped. Reduces maintenance to a minimum and eliminates risk of contaminating water supply with oil or grease film!

HIGH EFFICIENCY?

Pomona's unique semi-open impellers are readily adjustable to meet varying requirements of water flow without wasteful throttling. And, through advanced design, Pomona impellers drive the fluid through the pump without the abrupt changes in flow direction found in conventional pumps. Thus, maximum energy is concentrated on pumping the fluid—not wasted on overcoming internal flow friction!

WIDE ADAPTABILITY?

You can readily move a Pomona from one job to another—even from such widely divergent jobs as deep-well water supply to close-coupled line pumping. Cuts pump investment to the bone!



The "Toughest Pumping Job in the Plant"
SO THEY INSTALLED POMONAS!

These two Pomonas operate in one of the newest, most modern mill installations in the country, pumping highly abrasive tails and waste deposits from the floor sumps. The fluid these pumps handle is so thick with hard sharp grit it must be mechanically agitated to keep the material in suspension until it reaches the pumps. *No wonder they call this the "toughest pumping job in the plant"!*

But these Pomonas, equipped with rubber covered bowls and runners, easily take the job in stride. And the mine operators—*already Pomona-wise through years of experience on other tough pumping jobs*—selected Pomonas for this difficult job because they know Pomonas withstand terrific punishment on all types of mining work . . . cost far less to maintain and operate . . . require no priming, therefore are safe for automatic operation at remote locations . . . and will pump heavy fluids such as this without the problems inherent in suction lift pumps!

You'll find these and many other advantages in POMONAS!

IN FACT, *no matter what your pumping job* check with your nearby Pomona dealer on the *many* important savings that you can make by installing Pomonas . . . savings in installation costs, in operating costs, in repair and maintenance. Pomona capacities range from only a few gallons per minute to a flood of three hundred *thousand* gpm—and higher. There's a size to cut costs on your job!

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A DIVISION OF

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Pomona Products

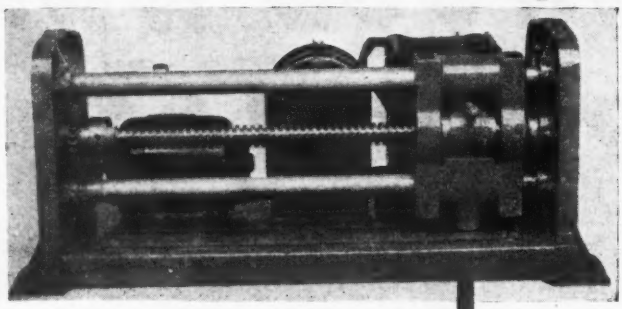
DEEP WELL PUMPS

NIAGARA PUMPS

MINE PUMPS

LITTLE CHIEF PUMPS

The GEARY-JENNINGS Sampler



View of Sampler with cover removed

Cuts Straight Across The Stream

This world-famed Sampler cuts straight across the stream—moves out of the stream at each cut—and takes equal percentages of all parts. The interval is positive, but variable to suit the need. The shielded mechanism prevents tampering or intrusion of dust. Whether it is sampling wet or dry materials, it "takes the whole of the stream a part of the time."

Bulletin 411 describes the operation and varied application to industry. Write for it today.

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48 S. 2nd EAST ST. METALLURGICAL DIVISION SALT LAKE CITY, UTAH

for transmitting large powers continuously *select* **DE LAVAL WORM GEARS**

The case hardened steel worms, bearing-bronze wheels, and copious lubrication give long life, without requiring attention other than occasional checking of oil level. The efficiency is high, reaching 97 per cent for certain ratios, and does not recede, but rather improves, with use. The transmission of power is shockless and noiseless.

Our engineers gladly supply data and give competent advice for the solution of speed transformer problems. Ask for Leaflet W-1128

DE LAVAL WORM GEAR DIVISION

of the De Laval Steam Turbine Co., Trenton, N. J.

MANUFACTURERS OF TURBINES STEAM HYDRAULIC PUMPS CENTRIFUGAL TROMPLER ROTARY DISPLACEMENT MOTOR-MOUNTED MIXED FLOW DIGESTER TYPE PROPELLER CENTRIFUGAL BLOWERS and COMPRESSORS GEARS WORM HELICAL and FLEXIBLE COUPLINGS

blasting for the British Ministry of Works in connection with strip mining of coal in England.

A. D. SPROLES, assistant general superintendent, Pocahontas Fuel Co., Pocahontas, Va., for the last ten years, has been promoted to general superintendent. He succeeds W. J. German, who has joined the U. S. Army.

ROBERT L. BOONE, superintendent at Pocahontas No. 7 mine, Pocahontas Fuel Co., Jenkinjones, W. Va., has been made assistant general superintendent, vice A. D. Sproles, promoted.

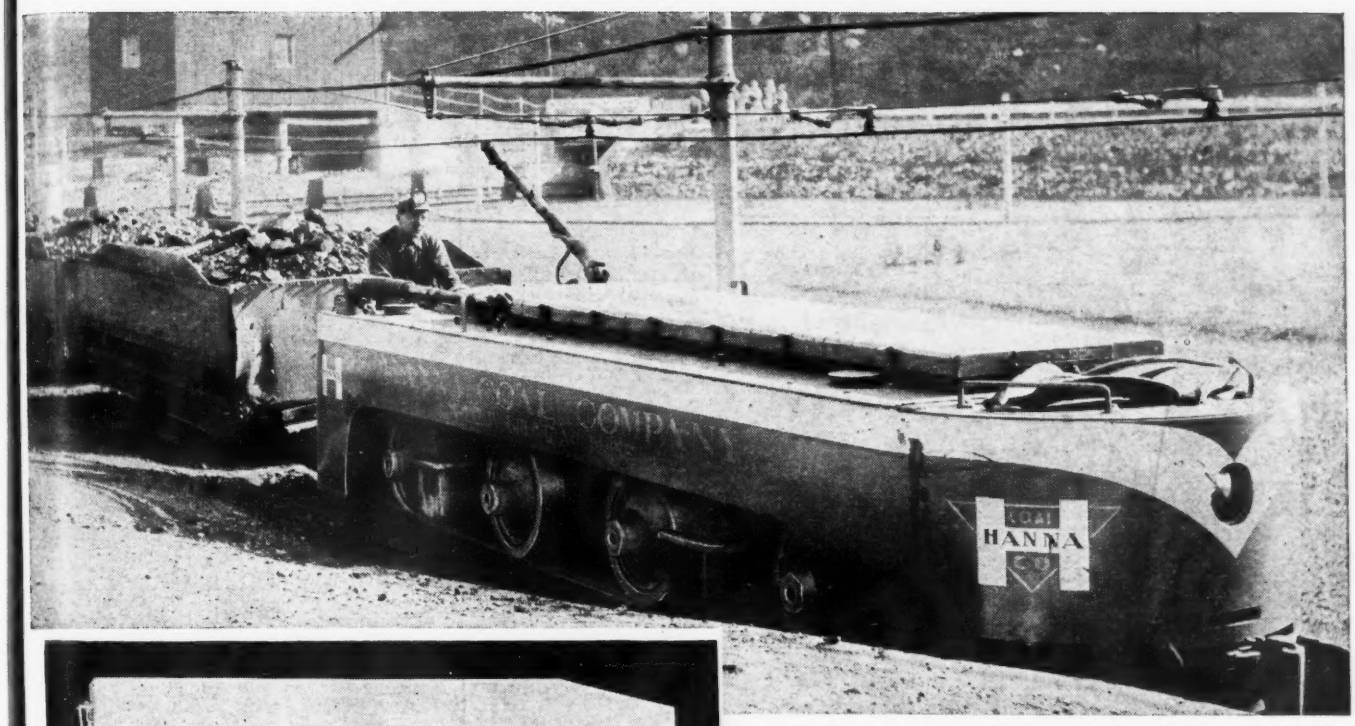
RAYMOND C. JOHNSON has been elected vice president in charge of research of Anthracite Industries, Inc., and will supervise the extensive research program being carried on at its laboratory at Primos, Pa. He succeeds H. J. ROSE, who resigned to become vice president and director of research of Bituminous Coal Research, Inc.

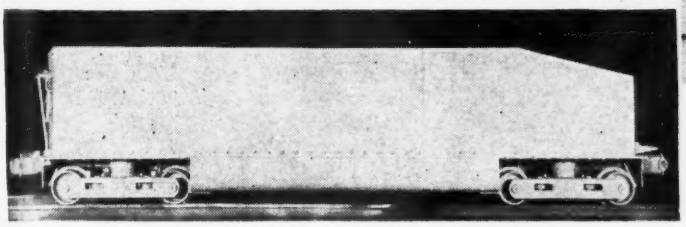
Raymond C. Johnson

Beginning his anthracite research and equipment development work in 1927, Dr. Johnson was subsequently associated with the U. S. Bureau of Mines and then with the Philadelphia & Reading Coal & Iron Co. as research engineer before joining Anthracite Industries research staff in 1937 at Mellon Institute. Four years later he became director of A. I. laboratory.

J. H. SCHNEIDER, executive vice president for many years of the Dawson Daylight Coal Co., Dawson Springs, Ky., has been elected president of the company to succeed Karl Jungbluth, deceased.

H. J. ROSE has been elected vice president and director of research of Bituminous Coal Research, Inc., in charge of the expanded investigational and developmental program of the bituminous coal industry. More than $2,000,000 will be invested in this research program in the next five years. Dr. Rose has had extensive experience in the technical and administrative phases of coal research. Starting with the Koppers Co. in 1918, he became assistant director of research of that organization. He has been with the anthracite industry since 1932, and is resigning as vice president in charge of research of





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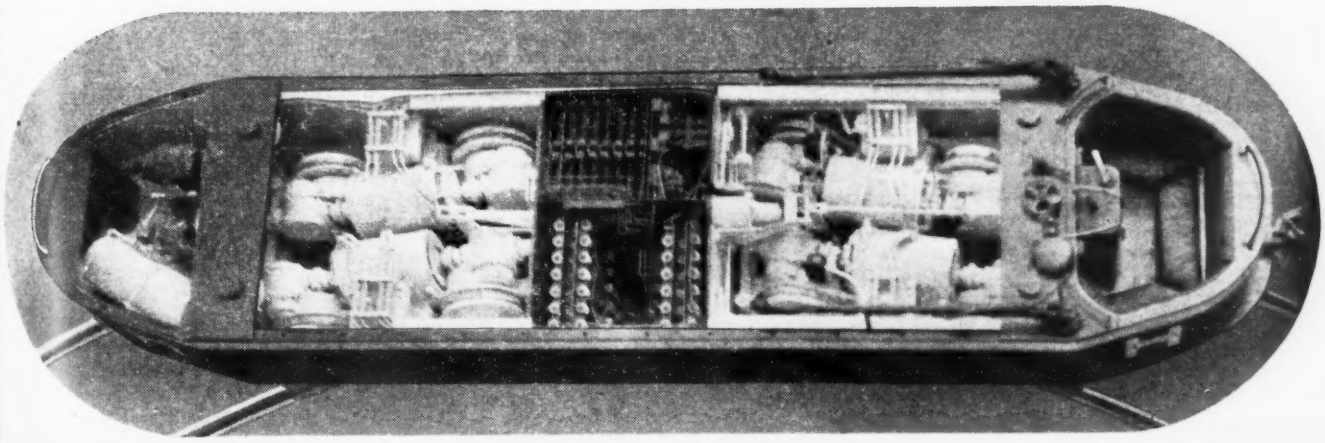
8 WHEEL AXLESS CARS and LOCOMOTIVES

Differential 8 Wheel AXLESS Mine Locomotives have more adhesion available for tractive effort and braking — pulls longer trains at higher speeds with greater safety —uses less current per ton of coal hauled.

Differential 8 Wheel AXLESS Mine Cars provide greater capacity within limited height—require fewer cars and less maintenance—assure safety at higher speeds—more tons per shift—less cost per ton.

Photo below shows 21 Ton Differential 360 H.P. 8 Wheel AXLESS Locomotive on 25 ft. radius curve.



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Builders of Haulage Equipment Since 1915

AIR DUMP CARS · MINE CARS · MINE LOCOMOTIVES · ROCK LARRIES · DUMPING DEVICES
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Here's Wet Gravity Separation AT ITS BEST

• In an effort to salvage badly needed fuel supplies from waste piles and culm banks, production-wise coal operators have turned to wet gravity separation as the only practicable and profitable solution.

That's why the trend among these operators is to Plat-O Coal Washing Tables . . . for in Plat-O Tables, they have found wet gravity separation at its best. Best because Plat-O reclaims the finest sizes (as small as ⅛" x 0) . . . best because Plat-O's "separation in full view" feature permits one man to handle as many as 20 tables (each producing 15 or more tons per hour) . . . best because Plat-O embodies all the advanced features of design and construction which can only come from long years of specialization.

Write today for full details.

DEISTER MACHINE CO., Fort Wayne 4, Indiana

SWITCH STANDS that CONSISTENTLY Prove Their Value in moving MORE COAL...FASTER

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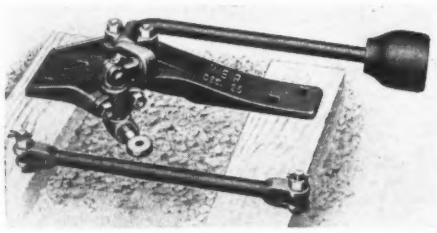
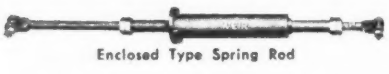


Design 25—Parallel Throw

Design 25—An improved Parallel Throw Stand of simple construction and easy operation. The stand is low to give maximum clearance; parts are interchangeable and easily replaced. Adjusting arm permits easy change of throw from 3" to 5".

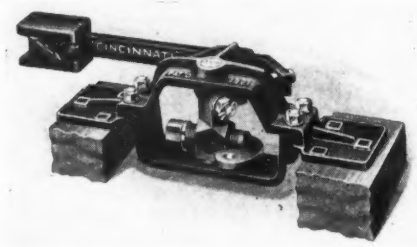
CHAMPION—Self-locking and non-automatic. The throw is adjustable by means of transferable shims which allow a variation of ⅛" and a range of 1".

Open Type Spring Rod



Enclosed Type Spring Rod

These switch stands furnished with either solid or spring connecting rods.



CHAMPION Parallel Throw

CATALOG "H" comprises 154 pages of helpful data, replete with photos, drawings and specifications, covers every track work need. Copy on request.

Suppliers to Mines and Railroads Since 1882

WEIR KILBY CORPORATION

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H. J. Rose

Anthracite Industries, Inc., New York City, to accept the new position. In assuming direction of the broader domain of bituminous coal research he is returning to his original field of activity. He has been associated with Mellon Institute throughout his professional career.

FRANK P. KERR has been appointed general manager of the Eastern Coal Corp., Stone, Ky., succeeding the late L. C. Skeen as operating head. Assistant to Mr. Skeen for three years, Mr. Kerr was made acting general manager when Mr. Skeen became critically ill in April. Mr. Kerr's first post in a supervisory capacity was as fireboss for the National Mining Co., Muse, Pa. Later he became a mine foreman for the Pittsburgh & West Virginia Coal Co. at Avella, Pa. Subsequently he served as district inspector and then as inspector at large for the West Virginia Department of Mines. For a time he also was mine foreman for the Excelsior Pocahontas Coal Co. in McDowell County. Before going to Eastern Coal Corp. he was with Koppers at Keystone and Carswell as division superintendent.

NEWELL G. ALFORD announced his withdrawal from the firm of Eavenson, Alford & Auchmuty, Pittsburgh, Pa., as of May 15. The business will be continued under the name of Eavenson & Auchmuty.

GEORGE A. LAMB, former chief of the Economics and Statistics Division of the Solid Fuels Administration, has been appointed to the newly created post of assistant director of the Bureau of Mines, to which virtually all activities of the Economics and Statistics Division of SFA have been transferred. Dr. R. R. Sayers, Bureau director, said that Mr. Lamb will direct coordinating programs of the Bureau and will administer the expanded activities of the Economics and Statistics service of the Bureau, which maintains authoritative up-to-date information on all mineral commodities. Hereafter the Bureau of Mines will be responsible for the collection, compilation and analysis of the bulk of statistical information regarding the coal industry, both bituminous and anthracite, of the United States, including surveys of manpower needs and other problems aris-

Durability

THE extra Durability of Preformed "HERCULES" (Red-Strand) Wire Rope is today helping to speed up the war effort in many battle stations—beginning with production of raw materials and following through to where the actual fighting is being done.

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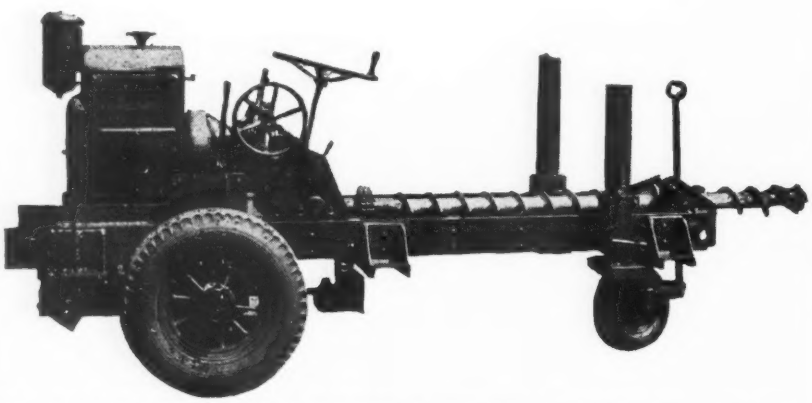
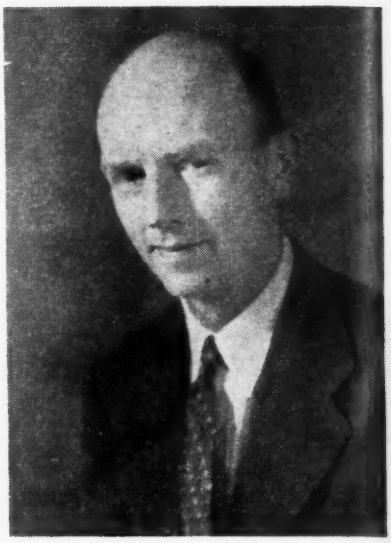
Parmanco Horizontal Drills give you "Positive Control Drilling." Parmanco Vertical and Horizontal Drills are today's leaders in low cost, low maintenance drilling—All Parmanco Drills are equipped with patented Parmanco augers. Used by leading strip mine operators—Write us your drilling problems.



PARIS MANUFACTURING CO.
PARIS, ILLINOIS



George A. Lamb

ing from the war, and will make such information available to SFA. Mr. Lamb, who is 38 years old, has had a varied career in government service, having seen duty with the Department of Agriculture, the National Recovery Administration, the National Bituminous Coal Commission, the Interstate Commerce Commission, and the Bituminous Coal Division before his assignment to SFA.

•

Consol Head Dies

Col. Malcolm McAvity, 55, president of the Consolidation Coal Co., 30 Rockefeller Plaza, New York City, died April 30 of pneumonia following an operation. After World War I he became active in the coal business in Canada, later becoming vice president of the Rochester & Pittsburgh Coal Co. He resigned in 1932 to become vice president of the Empire Coal Co., Ltd., and was elevated to the presidency in 1933. In that year, also, he was appointed assistant sales manager of the Consolidation Coal Co., becoming vice president in 1936 and president in 1941.

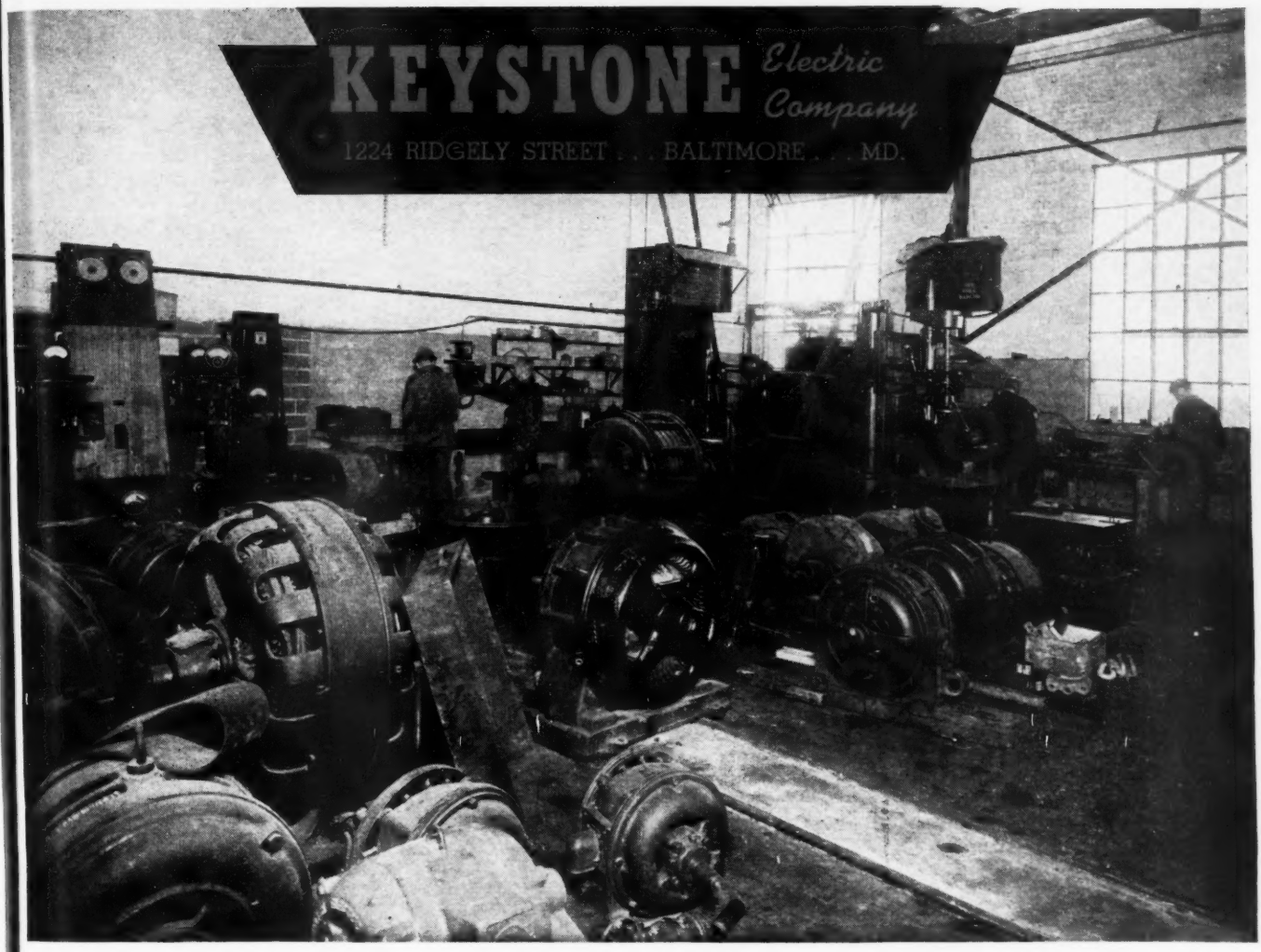
•

Obituary

GLENN HERBERT HATHAWAY, 52, chief electrician, Stonega Coke & Coal Co., Stonega, Va., for 31 years, died April 25 at the Stonega Hospital following injuries received when he was struck by a broken steel cable.

DAVID T. STUART, 57, mine manager, Vinegar Hill Coal Co. mine, Lensburg, Ill., died last month from injuries received nearly two years ago in a coal fall.

KARL JUNGBLUTH, 68, president of the Dawson Daylight Coal Co., Dawson Springs, Ky., died May 14 at his home in Louisville. Many years ago he joined the late Kenneth U. Meguire and the late Frank Sneed in the old Sneed-Meguire Coal Co. and later the Harlan Coal Co. The latter company was sold about 20 or more years ago to the Koppers interests, and subsequently the Meguire-Jungbluth organization formed the Dawson Daylight Coal Co.



Make Your Motors Like New!

REPLACE OLD-TIME SLEEVE BEARINGS WITH KEYSTONE BALL BEARING END BELLS!

SLEEVE BEARINGS don't cause all motor trouble—but they're accountable for too large a percentage of it. Well do you know that sleeve bearings wear and cause interference of rotor and stator on AC motors . . . and that oil, used to lubricate sleeve bearings is carried as a vapor in the ventilating air stream, causing coil failures or commutator burnouts.

Forestall these troubles . . . at low cost. Install Keystone Ball Bearing END BELLS and make your old motors perform as though they were new!

In your shop crowded with motors, check them over to find how many are on sleeve bearings. The proportion may surprise you. And you will discover how many "just-like-new" motors you will have by installing Keystone Ball Bearing End Bells on them.

Write for full information. Send us nameplate data from one of your motors which you are repairing now. We will send you quotations.

SOLD BY: *Ohio Ball Bearing Company, 655 Market Street, Youngstown 1, Ohio • Ohio Ball Bearing Company, 330 E. Eighth Street, Cincinnati, Ohio • West Virginia Bearings, Inc., 8 E. Virginia Street, Charleston, West Virginia • Indiana Bearings, Inc., 643 Ohio Street, Terre Haute, Indiana • Bearing Service Company, 9 N. W. First Street, Evansville 1, Indiana • Berry Bearing Company, 2633 S. Michigan Avenue, Chicago, Illinois • R-J Bearings Corporation, 3152 Locust (at Compton), St. Louis, Missouri • Associated Bearings Company, 207 E. Twenty-second Street, Kansas City, Missouri • Colorado Industrial Supply Company, 1620 Wazee Street, Denver 17, Colorado • Bearing Service & Supply Company, 68 W. Fourth Street, Salt Lake City, Utah.*

Song of the Desert

NO longer do the harsh overtones of sun and cactus, wind and boiling sun echo through the vast emptiness of the desert. Today orchards give a lush soliloquy to the muted voices of happy farm workers. The vibrant sun is now a friendly ally for the thirst quenching water. Lombard Irrigation Pumps have played their part in transforming death into life. Lombard Hydraulic Equipment is doing vital work in many fields.

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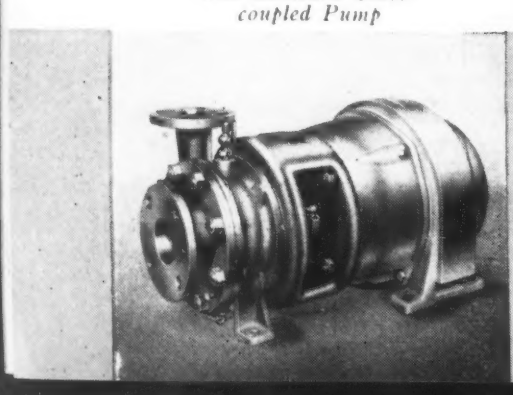
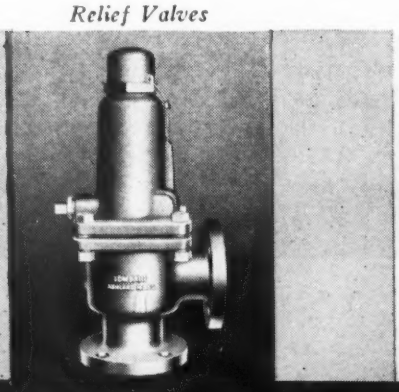
The Lombard Close-coupled Pump



Relief Valves



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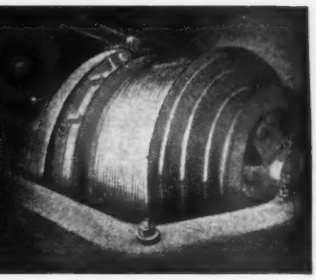
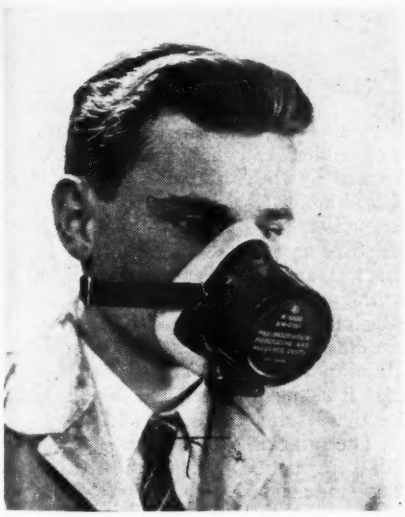
TIPS FROM MANUFACTURERS



Respirator Facelets

American Optical Co., Southbridge, Mass., announces that its R-1000 respirator, developed to protect workers against dust, fume and gas hazards, is now being equipped with knitted cotton facelets. These make any respirator comfortable to wear because they are soft against the skin, absorb perspiration and give the face a certain measure of protection against dust and dirt.

These features are said to help to prevent skin irritation and to do away with the necessity for protective creams to avoid



face chapping. Designed to make any industrial operation more comfortable, the facelets are said to be particularly valuable where workmen handle such products as cement, lime and gypsum, or perform operations like paint spraying. The new AO facelets can be ordered separately. Packed 50 in a box, they can be washed and used over and over again. They will fit almost standard design respirators.

•

Lubricating Systems

Stewart-Warner Corp., Chicago, offers industrial lubricating equipment designed to meet strenuous requirements brought about by 24-hour-a-day war production. The new equipment is composed of four centralized lubricating systems designed for application to small, medium and large heavy-duty machinery as well as to large batteries of machinery where it is desirable to lubricate hundreds of bearings from a central point. The four systems are:

Alemite LubroMeter, the simplest form of centralized lubrication from the standpoint of installation and economy of installation; has only two moving parts in its valves and is said to handle satisfactorily both oil and grease.

Alemite Dual Progressive System, a single-line progressive system of centralized oil or grease lubrication; provides for positive delivery of a predetermined quantity of lubricant through a single pipeline to each of a number of bearings and is provided with an indicator that signals the operator when the lubricant cycle is completed.

Alemite Progressive System, the original A.P. system incorporating new design and manufacturing features; a method of centralized grease lubrication that will lubricate from 3 to20 bearings, feeding each in turn with a predetermined quantity of lubricant.

Alemite Dual Manifold System, a dual-line system of centralized lubrication designed for high-pressure grease or oil lubrication; can be applied to any number of bearings on one machine or a battery of machines.

•

Steel Hardener

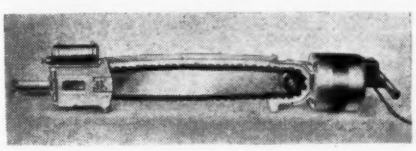
Steeltem Chemical Co., 51 East 42d St., New York 17, N. Y., offers a new steel-hardening solution called Super Tem. Its action on gears, pinions, axles, shafting and other maintenance parts used in industries and other fields is said to be to impart tremendous hardness, prolonging their hardness and minimizing replacement. Its use is recommended for high-speed cutting tools that operate with a rotary or uniform motion.

•

Power Chain Saw

Lombard Governor Corp., Ashland, Mass., offers the Chain Lightning electric or air power chain saw for fast cutting action. The fast-cutting action results from a narrow kerf and from a series of four teeth arranged so that the right cutter tooth is followed by a right raker of about two-thirds the width of the kerf. The left cutter is followed by a left raker of the same width, so the rakers overlap their cuts in the center.

By using a patented permanently welded



hook form of construction instead of the usual riveted type an interlocking chain is provided. Chain links are manually assembled or disassembled in the field—without the use of tools—in about two minutes, simply by hooking and unhooking.

•

Welding Calculator

A new calculator, 6¼ in. in diameter and consisting of four movable sections of heavy cardboard stock, designed for readily determining the welding preheating and interpass temperatures of steels in those few

cases where experience indicates the need of preheating to obtain best results, is offered by the Lincoln Electric Co., Cleveland, Ohio. Complete instructions in the form of six simple steps are printed on the outside sections.

•

Welding Electrode

Wilson Welder & Metals Co., 60 East 42d St., New York 17, N. Y., offers a new coated aluminum-bronze electrode—Wilson No. 200. This new shielded arc electrode, which also can be used as a filler rod in carbon arc welding, will produce, it is said, welding deposits of great strength and hot ductility, combined with desirable resistance to corrosion.

Having broad application in the welding of most bronzes, malleable and cast iron or steel, it also can be used for welding dissimilar metals, such as cast iron to brass, steel to malleable iron, or the joining of any two metals that are weldable with aluminum-bronze. Sizes from $\frac{1}{8}$ to $\frac{5}{32}$ in. in 14-in. lengths and $\frac{1}{4}$ in. in 18-in. lengths are standard stock items. Sizes from $\frac{5}{16}$ to $\frac{1}{2}$ in. in 18-in. lengths may be procured on special order.

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With simple spring draft gear

Speed haulage operations—Reduce accidents

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Pay Dividends

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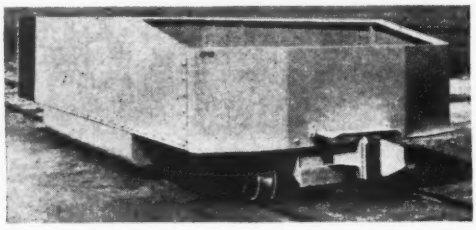

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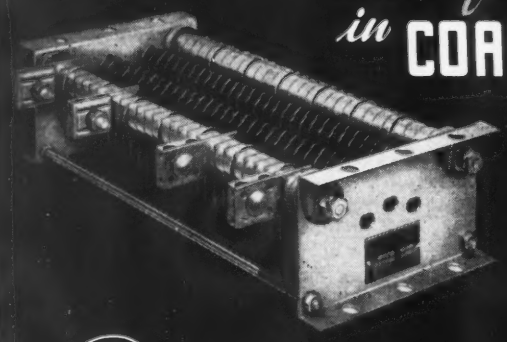
The Unbreakable
STEEL GRID RESISTORS
for
HEAVY DUTY SERVICE
in COAL MINES



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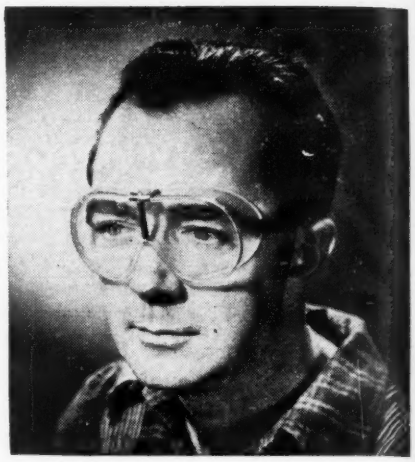
THE POST-GLOVER ELECTRIC COMPANY
ESTABLISHED 1892
221 WEST THIRD STREET, CINCINNATI, OHIO



Safety Goggle

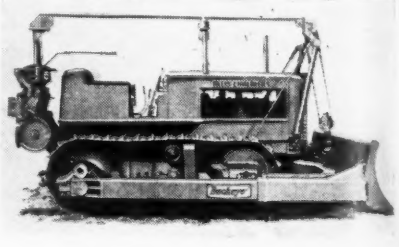
Watchemoket Optical Co., Inc., Providence 3, R. I., offers a strong new all-plastic goggle for general industrial utility. Its one-piece lens is of shatter-proof methacrylate that is said to withstand heavy impact and be highly resistant to pitting caused by sparks. The curved plastic frame fits the face snugly but comfortably and shields the face from every angle; reinforced with brass clip at bridge; non-fogging.

•

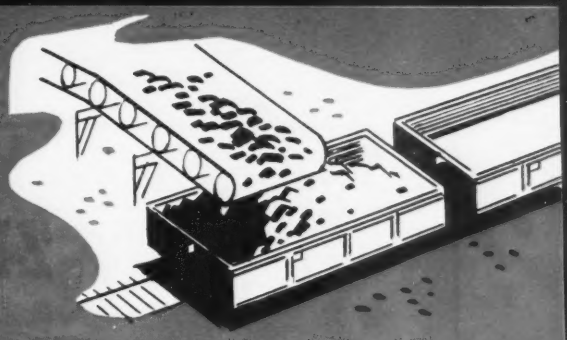
Dozer-Trailbuilder

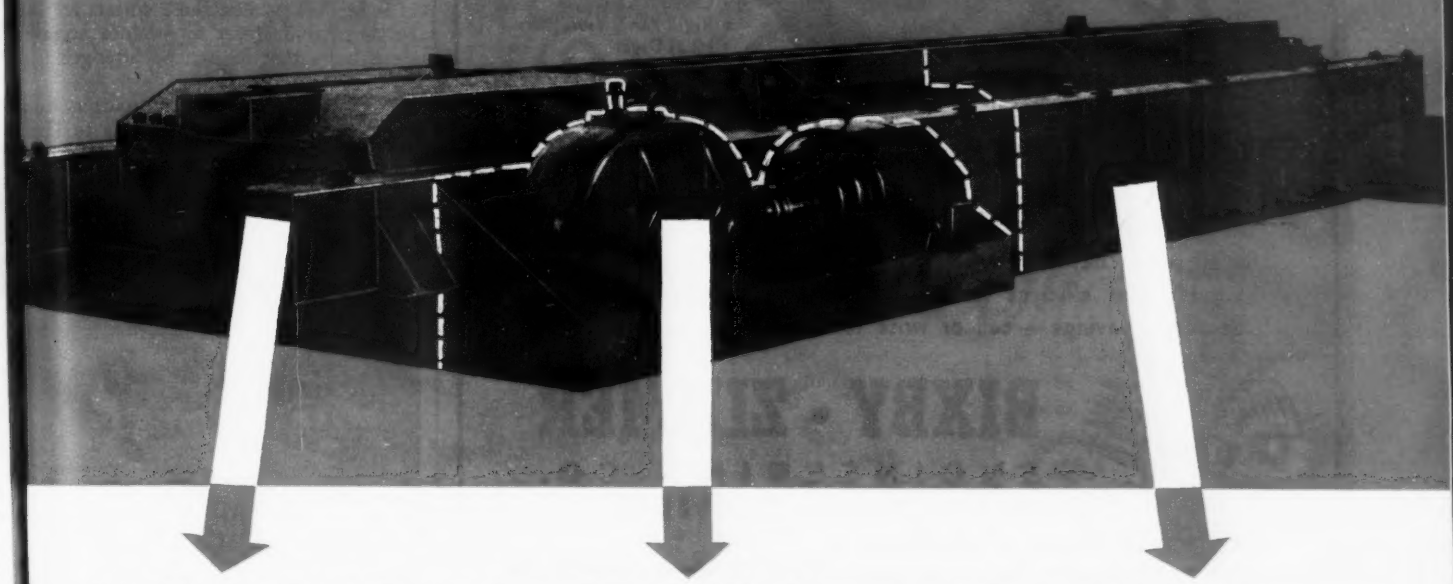
A new cable-controlled bulldozer and trailbuilder, known as the "Centro-Lif," offered by the Buckeye Traction Ditcher Co., Findlay, Ohio, comes in two models: one weighing 5,855 lb., without the power-control unit, for Allis-Chalmers HD-14 tractors, and the other, weighing 5,140 lb., without the power-control unit, for Allis-Chalmers HD-10-W tractors. Both models are controlled by Buckeye single- or double-drum power-control units. The new design is engine-mounted and cable is carried overhead from winch to moldboard.

The principal new feature is the center-lift construction, for which these advantages are claimed: light weight for its size, simple construction and straight lift of the blade. The horn is so designed that the moldboard is close to the tractor radiator, and the push arms so that the moldboard pivots about a single king pin and can be angled to the right or left simply by removing two landside pins, swinging the moldboard to the desired side, and replacing the landside pins. The moldboard can be tilted easily also by means of a double trunnion mounting of the push arms. By attaching one push arm to the top trunnion on one side while the other arm is mounted on the lower trunnion on the opposite side, a vertical adjustment of 12 in. at the end of moldboard is provided.

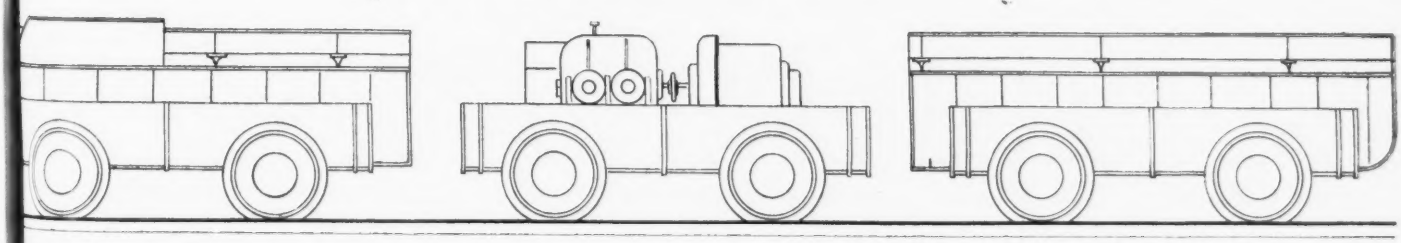


More Profitable Conveyor Mining with the NOLAN TRIP FEEDER





3-Piece Knock-Down Assembly Easily Transported on Supply Cars



WHY TIE UP valuable, much-needed equipment and manpower handling trips, when you can get a Nolan Trip Feeder to do the job speedily and economically!

The efficiency of the mechanical design in this unit accounts for its compactness, ruggedness and simplicity. No ropes or pulleys are used. The gear-driven conveyor, which is push-button operated, permits finger-tip control of every car in the entire trip. The movement is smooth and continuous . . . there is no jerking or jolting. Waste motion is eliminated, saving time, labor and current. This firm but gentle control is easy on the cars and on the entire trip feeder, assuring long life with a very minimum of upkeep expense.

The girder frame is so constructed that it can be installed on two large timbers placed across the haulage way and secured by wedges and jacks. It can be shifted readily to points in the mine where empty cars are to be moved under the discharge points of the conveyors in the mine.

These are times that demand heavy coal production at lowest possible cost—write for full information on how the Nolan Trip Feeder can help you do this.

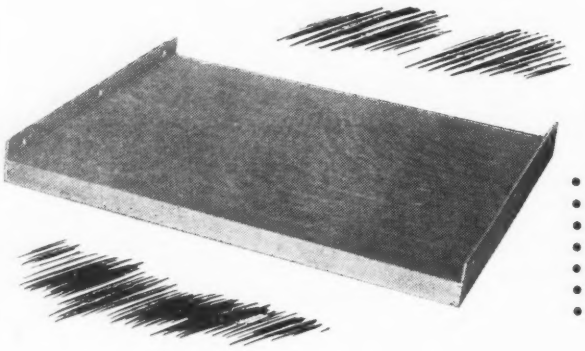
THE MINING SAFETY DEVICE CO.

★ BOWERSTON, OHIO ★

NOLAN

FOR BETTER *Results* AND *Low Cost*

USE **"BEE • ZEE"** SCREENS



ALL TYPES SCREENS

- Chute & Conveyor
- Rigid Panel Vibrator
- Heat Dryer
- Hook-type Vibrator
- Shaker Panel
- Centrifugal Dryer
- Sizing Screen

Bixby-Zimmer round-rod screens are tailor-made in many designs for all sizing, dewatering and drying equipment. They're built for long life and efficient screening operation. Take advantage of "Bee-Zee" savings — call or write for information today.

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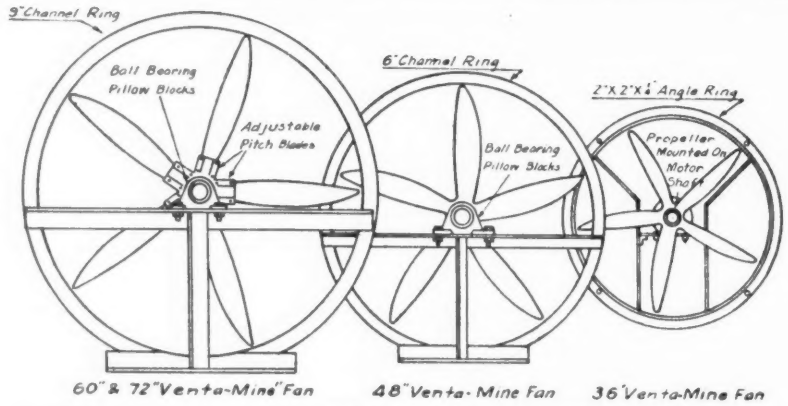


60" & 72" Venta-Mine Fan — 48" Venta-Mine Fan — 36" Venta-Mine Fan

"VENTA-MINE" Ventilating Fans

FIVE STAR QUALITIES

★ High All Around Efficiency
★★ Simplest Possible Construction
★★★ Replaceable Ball Bearing Pillow Blocks
★★★★ Lightweight Aluminum Propeller Blades
★★★★★ Double Extension Shaft

PERFORMANCE CHART:

Capacities in thousands of cubic feet per minute vs inches of water pressure.

Size	HP	RPM	Static Pressure Free Air	.1"	.2"	.3"	.4"	.5"	.6"	.7"	.8"	.9"	1.0"	1.1"	1.2"
36"	2	1750	165	15.5	14.0	13.0	11.5	10.5	9.0	7.4	5.5	3.5			
48"	5	1150	300	284	260	230	190	150	105	6.5	2.0				
48"	10	1750	490	470	445	420	400	375	340	320	290	265	240	220	180
60" Low Pitch	7½	1150	410	400	390	370	345	310	270	230	190	145	100	50	
60" High Pitch	15	1150	840	830	820	800	780	745	710	670	630	570	500	425	350
72"	20	900	1003	960	930	890	850	810	780	740	695	650	600		
72"	25	900	1145	1090	1050	1000	970	940	890	850	810	770	730		

GUYAN MACHINERY CO., LOGAN, W. VA.

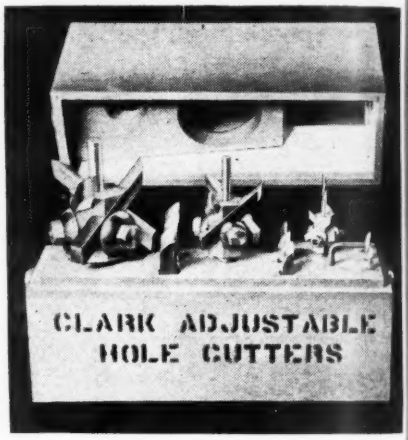
Maximum height of lift of leading corner of blade is 53 in., while digging depth below grade is unlimited. Trail builder moldboard is 12 ft. 9⅝ in. long and 37 9/16 in. high and is fitted with reversible cutting edge and replaceable corner bits.

•

Hole Cutters

A new set of three adjustable hole cutters that cut all possible diameters from ⅝ to 3½ in. is offered by the Robert H. Clark Co., Beverly Hills, Calif. With straight shanks for use as hand tools, in portable electric and pneumatic drills or in light drill presses, these cutters are said by the manufacturer to produce accurate, clean holes that require no after-grinding, reaming or filing.

The smallest of the three cutters has a ⅜-in. straight shank, cuts holes ⅝ to 1¼ in. in diameter and is equipped with a ¼-in.



drill pilot. The second size has a ½-in. straight shank and cuts all diameters of holes between 1 and 2½ in. The largest hole cutter in the set has a ½-in. straight shank or No. 2 Morse taper and covers all diameters between 2 and 3½ in. The hardened and ground pilots on the larger sized tools are removable and may be replaced with lead drills if desired.

•

Conveyor Belts

Conveyor operations extending as far back as 6½ miles in a single belt will be possible with new steel cable "compass" conveyor belts offered by Goodyear Tire & Rubber Co., Akron, Ohio, according to W. C. Winings, manager, mechanical goods division.

"Development of the steel-cable belt for moving coal and other bulk products came as a result of projects requiring cotton cord belt designs where the cords had to be as large as ½ in. in diameter, said E. W. Stephens, Goodyear's head of belting sales. "The cables are laid in parallel, side by side for the full length of the belt, in a single plane. The cables are brass-plated prior to being covered with rubber, thus obtaining adhesions — rubber-to-steel — much higher than were possible in steel-to-cotton.

"The flex life of the steel cables assembled in the new belts far exceeds that of cotton cord, rope or fabric," he explained. "One reason—in addition to the

Specify AIRCO quality welding supplies

"Tops" for every gas and arc welding need

AIRCO GAS WELDING RODS

Airco No. 1 Alloy Steel Rod

Developed especially for gas welding of steel plate and pipe comparable to Grade A and Grade B pipe analyses. Outstanding among its features are the high ductility of deposits, smooth flowing qualities, and resistance to heating. Five sizes from 1/16″ to 1/4″—36″ lengths.

Airco No. 7 Mild Steel Rod

A smooth flowing, copper-coated rod of dependable, uniform quality for general gas welding of steel plates, sheets, pipe, etc. Seven sizes from 1/32″ to 1/4″—36″ lengths.

Airco No. 9 Cast Iron Rod

A very high quality cast iron rod, free from sand or scale. It flows freely and produces clean, sound, soft machineable welds. Sizes, 3/16″, 1/4″, 3/8″ in 24″ lengths and 1/8″ in 18″ length.

Stoody Hard Facing Alloys

A complete line of alloys for building up wearing surfaces by oxy-acetylene flame and electric arc welding. These alloys are furnished in types to meet every service condition.

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General Offices: 60 East 42nd Street, New York 17, N. Y.
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One-half of air pumped never reaches the face — You can better that percentage at your mine with—

Try the "Blow-Torch Test"

MOROPA
COTTON BRATTICE CLOTH

This is no time to risk production losses through faulty ventilation . . . . MOROPA COTTON BRATTICE CLOTH, as proved in the mines of many leading producers, is the soundest choice for the safety that allows you to boost vital production.

A careful examination of MOROPA'S characteristics reveals the reasons for its acceptance. MOROPA is Flame-Resistant, has low Porosity, Resists Mildew, and gives Maximum Wear.

See data on MOROPA, page 123 of the 1943 Coal Mining Catalog . . . or write us! MOROPA comes in standard widths up to 84 inches. Other sizes special.

Moropa

. . . . *made in America, of American Cotton, manufactured by . . . .*

Act today to eliminate unnecessary ventilation risks . . . . install MOROPA.

JOHN FLOCKER & COMPANY

642 GRANT ST. EST. 1822 PITTSBURGH, PA.

MOSEBACH RAIL BONDS

TYPE M12-F TYPE M9-F TYPE M8-F

MORE POWER AT THE FACE *with*

MESCOWELD Rail Bonds

★ The flow of power is no greater than the weakest section in the circuit. If these weak sections are not efficiently bonded you are not getting the power you pay for at the face.

Use MESCOWELD RAIL BONDS flashwelded to insure decreased resistance, greater conductivity and longer bond life which will give you more power at the face and afford maximum production on your haulage road.

MESCOWELD RAIL BONDS are manufactured in 18 different styles —a style for every bonding requirement. Better bonding means better service; specify MESCOWELD RAIL BONDS—your most important link between power and profits.

Write for the MOSEBACH Catalog No. 44 today for details on these efficient rail bonds and many other mine supplies.

MOSEBACH

ELECTRIC & SUPPLY COMPANY

1115 Arlington Avenue Pittsburgh, Pa.

metallurgical advances—is that the 3/64-in. o.d. steel cable is so small that it enjoys a ratio of 1,000 to 1 when flexed over a conventional 48-in. head pulley, whereas good wire-rope practice would ask for a ratio of sheaves to cable diameter of 80 or 100 to 1. With steel cables not exceeding $\frac{5}{32}$-in. o.d. and an over-all belt thickness no greater than the conventional 6-ply structure a strength equivalent to 60 plies of heavy duck is available."

•

Insulating Varnish

Sterling Varnish Co., 182 Ohio River Blvd., Haysville, Pa., has developed R-851, which the manufacturer recommends to the electrical industry as an extremely flexible insulating varnish. It is designed for applications demanding great lead wire flexibility in addition to high mechanical strength. Said to show little progressive hardening when the dried film is exposed to the air, it is further recommended for coating armature and stator coils that will be stored for long periods before assembly.

This clear baking varnish is said to dry completely throughout when baked at a temperature of 135 deg. C., the dried insulation to be oilproof and afford protection that is exceptionally water-, acid- and alkali-resistant. It is particularly recommended for electrical equipment wound with glass-covered wire designed to operate at exceptionally high operating temperatures.

•

Industrial Notes

United States Rubber Co., Rockefeller Plaza, New York, has named Ernest G. Brown as general manager of mechanical goods, general products and "Lastex" yarn and rubber-thread divisions, succeeding Willard H. Cobb, recently elected vice president and member of the executive committee, J. L. Cantwell, former production manager of the Bristol (R. I.) plant, has been made sales manager of battery separators.

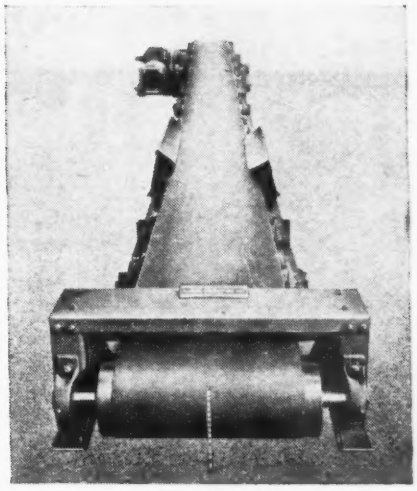
Westinghouse Electric International Co., subsidiary of Westinghouse Electric & Mfg. Co., has elected John W. White as president and general manager. William E. Knox, formerly assistant general manager, has been elected vice president. Formerly vice president and general manager, Mr. White succeeds George H. Bucher, who becomes chairman of the board.

Walter P. Arnold, technical director, Koppers Co., Wood Preserving Division, has been elected president of the American Wood Preservers' Association.

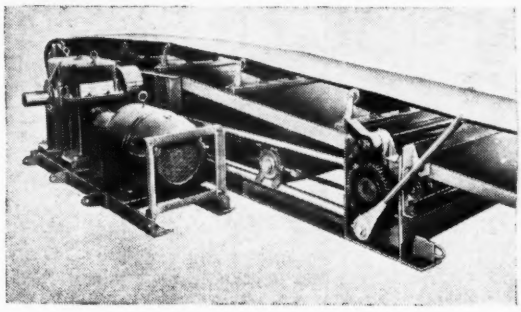
Bristol Co., Waterbury, Conn., manufacturer of automatic control and recording instruments, has opened a new Cleveland branch office in the Engineers' Building. It will serve Kentucky and Ohio with the exception of the Toledo area. G. H. Gaites has been appointed regional sales supervisor of the Cleveland and Pittsburgh territories. H. C. Clarke has been named district manager at Pittsburgh.

Dorr Co., 570 Lexington Ave., New York 22, N. Y., has appointed Charles K.

Here's the *Mine Conveyor* YOU wanted

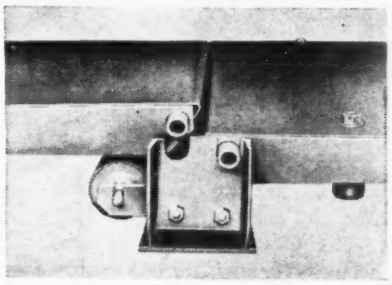


Many of the leading mine operators throughout the country discussed their conveying problems with Robins engineers. As a result Robins developed a Mine Conveyor which incorporates several entirely new principles of design and construction.



1. **HEIGHT OFF FLOOR**—The new Robins Mine Conveyor has a belt line only 15" above the floor, with return Idlers so designed that they clear both the floor and its accumulations.
2. **4" IDLERS . . .** ball bearing and easily lubricated; four inches in diameter . . . no wonder this Conveyor gets out tonnage!
3. **TAKEUP TYPE**—Ratchet-and-pawl type built into Conveyor. Provision made for easy attachment of counterweighted gravity type if desired.
4. **TAKEUP POSITION**—Takeup in Head Section, operated from either side, enables belt-tension to be adjusted without walking full length of Conveyor. Takeup handles 10 ft. of belt slack and a Special Section handles an additional 8 ft., making a total of 18 ft. without cutting belt.
5. **HIGH RATED CAPACITY**—Up to 300 TPH over lengths as great as 3000 ft. Operates normally with single Pulley Drive but Pulley Outfits are built into Head Section for Tandem Pulley Drive.
6. **INTERMEDIATE SECTIONS**—Easily extend the Conveyor-length. Dropped in (not bolted) as you need them. Alignment is assured because they are jig-assembled in our shop and shipped in one piece. Deck plates in Intermediate Sections are No. 14-gauge metal.

The new Robins Mine Conveyor can be fed from Tail end, or from anywhere along entire length of Intermediate Sections. It can be assembled, extended or moved without using tools and operated in reverse direction, to carry men and materials into the mine. Both Head and Tail Sections are mounted on skids for smooth sliding over rough surfaces, with no steel work projecting below them. Both ends are easy to clean out. Drop-in feature enables Conveyor to follow contour of seam. The Robins Mine Conveyor can be anything you want it to be anywhere you put it. It is now operating and increasing tonnage in a number of mines. It can do the same in yours. For full details, write Dept. CA-6.



ENGINEERS • **MANUFACTURERS** • ERECTORS

ROBINS CONVEYORS
INCORPORATED
Founded in 1896 as Robins Conveying Belt Co.
PASSAIC • NEW JERSEY

MATERIALS HANDLING MACHINERY

ROBINS ***makes:*** BELT CONVEYORS • COAL AND ORE BRIDGES • BUCKET ELEVATORS • CAR AND BARGE HAULS • CAR DUMPERS • CAR RETARDERS • CASTINGS • CHUTES • CONVEYOR IDLERS AND PULLEYS • CRUSHERS • FEEDERS • FOUNDRY SHAKEOUTS • GATES • GEARS • GRAB BUCKETS • PIVOTED BUCKET CONVEYORS • VIBRATING SCREENS • SCREEN CLOTH • SELF-UNLOADING BOAT MECHANISMS • SKIP HOISTS • STORAGE AND RECLAIMING MACHINES AND SYSTEMS • TAKEUPS • LOADING AND UNLOADING TOWERS • TRIPPERS • WEIGH LARRIES • WINCHES • WINDLASSES

FOR MATERIAL AID IN MATERIALS HANDLING . . . . . It's **ROBINS**

McArthur, metallurgical engineer, as manager of its eastern sales division. He succeeds Dr. C. L. Knowles, who resigned to become technical director of the General American Transportation Co. Directly assisting him are W. B. Gery, H. W. Hitzroot, R. Chelminski and Dr. F. P. Lasseter.

ELECTRIC STORAGE BATTERY CO., Philadelphia, has elected C. F. Norberg as vice president in charge of manufacturing and D. N. Smith as comptroller.

CRESCENT LUBRICATING CO., First Huntington National Bank Building, Huntington, W. Va., sales firm for Troco Lubricating Co., announces that J. E. Sale has joined that organization. He will continue to reside and make his headquarters at Huntington.

BUCKEYE TRACTION DITCHER CO., Findlay, Ohio, has appointed A. M. Guthrie as field sales manager. He will be in charge of distributor policies and appointments through district managers. He has been eastern district manager at Philadelphia since January, 1940.

GENERAL ELECTRIC CO., Schenectady 5, N. Y., has named Willard V. Merrihue as manager of the advertising and sales promotion divisions of its apparatus departments. Simultaneously he was named a member of the apparatus sales committee of the company. Previously he was assistant to the manager of the apparatus publicity divisions.

NATIONAL BATTERY CO., Gould Commercial Division, Depew, N. Y., has appointed George E. Hulse as research director. He goes to this post from the United States Rubber Co., Passaic, N. J.

JOSEPH T. RYERSON & SON, INC., announces the following changes in its executive structure: Harold B. Ressler, vice president, located at the New York plant, moves to the executive offices in Chicago, where he will be in general charge of sales in all territories. Ainslie Y. Sawyer, assistant to the president, has been elected vice president. He will continue at Chicago in general charge of purchases. Harry W. Treleaven, assistant manager of the New York plant, has been appointed manager there. Thomas Z. Hayward, who has been appointed assistant general manager of sales, was in charge of tubing sales and priorities.

MACK TRUCKS, INC., Empire State Bldg., New York City, announces that M. J. Chollet has been appointed district manager of the St. Louis (Mo.) branch, while C. L. McLure heads the Louisville (Ky) branch.

WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa., has elected four new vice presidents: R. A. Neal, manager, switchgear division, East Pittsburgh works; J. K. B. Hare, manager, central district sales activities, with headquarters in Pittsburgh; John H. Ashbaugh, manager, electric appliance division, with headquarters in Mansfield, Ohio; and H. H. Rogge, manager, Washington government office. Mr. Neal becomes vice president and sales manager, reporting to B. W. Clark, vice president in charge of all sales activities of the company. Mr. Rogge for the time being will continue to make his head-

BRISTOL'S BELT FASTENERS

For leather, rubber or woven belts and conveyors — up to 13/16". Write for Bulletin 728A.

THE BRISTOL COMPANY
139 Bristol Road, Waterbury 91, Conn.
DISTRIBUTORS EVERYWHERE

Save Accidents—Money!

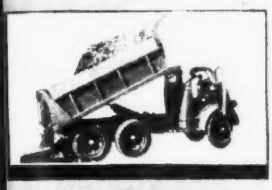
American Mine Doors, operating mechanically, entirely automatic, eliminate the service of a trapper-boy—eliminate the necessity for the train to stop and start—eliminate possibility of accidents. We don't need to figure out the expenses for you which a smoothly mechanical operating door would save. Speed-up in hauling is the big accomplishment which makes for increased profits, so that these doors quickly pay for themselves.

AMERICAN MINE DOOR CO.
2057 Dueber Avenue Canton 6, Ohio

Safe - Speedy - Hauling with Canton Automatic Door

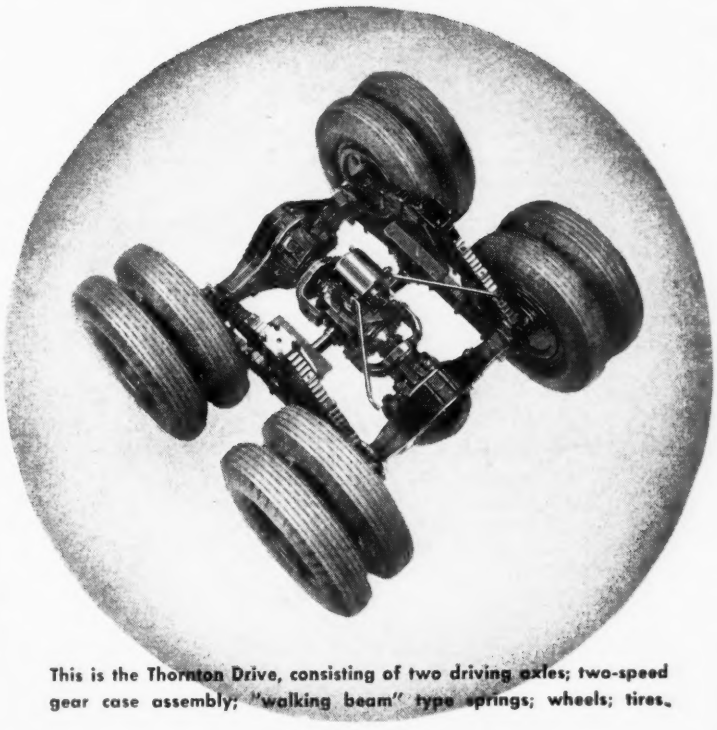
HOW TO MAKE YOUR MEDIUM TRUCK EARN MORE MONEY

LOGGING



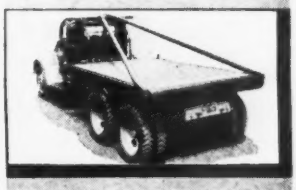
MINING

GENERAL HAULING



This is the Thornton Drive, consisting of two driving axles; two-speed gear case assembly; "walking beam" type springs; wheels; tires.

LUMBERING



OIL PRODUCTION

DUMP TRUCK WORK

ADD THE THORNTON *FOUR REAR WHEEL* DRIVE! CONVERT IT INTO A HEAVY DUTY TRUCK

Whether you own, or expect to buy, a medium truck, you both save and make more money when Thornton properly engineers and installs this 2-drive axle BOGIE, thus converting a 1½-2 ton medium truck into a powerful, 6-wheel heavy duty truck, capable of delivering 100% *more* rim-pull which permits hauling 100% *more* payload through sand, mud, muck, snow, over ice and up steeper grades.

- Make your converted truck do double duty . . . haul twice as much . . . earn more money.
- Write today for full particulars.

You SAVE *on*

✓Investment, operation, upkeep.

✓Gas, oil, tires, chains, wages, manpower, insurance, time-delivery schedules.

NO PRIORITY

Installations readily available.

THORNTON TANDEM CO.

8715-A GRINNELL AVENUE • Plaza 9700
DETROIT 13, MICHIGAN, U.S.A.

Investigate THORNTON *Automatic-Locking* DIFFERENTIAL for Replacement in Truck Axles

In Canada see: H. V. WELLES, LTD., Windsor

Thornton Tandem Co.
8715-A Grinnell Avenue
Detroit 13, Michigan, U.S.A.

Please send me catalog of facts on changing my 1½-2 ton truck into a heavy duty truck.

Name_____

Address_____

City_____ State_____

Make of Truck_____ Year_____

Used for_____

ANOTHER STOKER DAMAGED

by

TRAMP IRON

And another customer lost! Stokers cannot digest tramp iron and the inevitable result is a black eye for the coal distributor. No need to go into details, BUT

The growing stoker coal market demands magnetic protection — powerful electrically energized magnets either in the form of magnetic pulleys, as shown (Bulletin 301) automatic spout magnets (Bulletin 97-A) suspended magnets (Bulletin 25-B) or others. ELIMINATE TRAMP IRON with

Stearns **MAGNETIC**

equipment, in satisfactory and profitable use by outstanding producers and distributors. When you write give us details on capacity, plant layout, etc.

STEARNS MAGNETIC MANUFACTURING CO.
661 S. 28th St., Milwaukee, Wis.

STEARNS-MAGNETIC MILWAUKEE

quarters in Washington. The responsibilities of Mr. Hare and Mr. Ashbaugh are unchanged. John M. McKibbin has been appointed as assistant to the vice president. R. C. Brannan has been made manager of the transformer equipment section of the transformer division at Sharon, Pa.

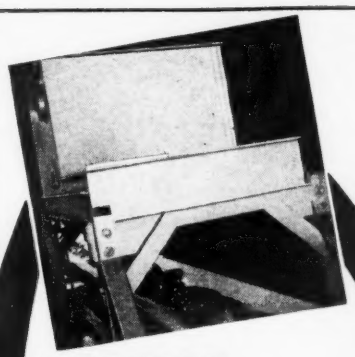
FRANK B. ALLEN, president, Allen-Sherman-Hoff Co., Philadelphia, has been awarded the Longstreth Medal of the Franklin Institute for his invention of a seal ring for use in Hydroseal pumps handling abrasive solutions. The citation says Allen's Hydroseal pump "is provided with a supply of clean flushing water between rotating impeller and stationary side plates to prevent entry of abrasive materials into these spaces, thereby greatly reducing wear at the pump seals."

ROBINS CONVEYORS, INC., Passaic, N. J., announce the return of Major Maurice B. Bradley to its sales department. Working out of Passaic headquarters, he will devote his attention to the sale of vibrating machinery—screens and shakeouts.

UNION CARBIDE & CARBON CORP., New York City, announces that Joseph G. Davidson has been elected president of Carbide & Carbon Chemicals Corp. and Carbide & Carbon Chemicals, Ltd. James W. McLaughlin is the new president of the Bakelite Corp. He will direct all of the plastics operations of units of the corporation, including the plastics division of Carbide & Carbon Chemicals Corp. Stanley B. Kirk becomes president of the Linde Air Products Co., the Prest-O-Lite Co., Inc.; Dominion Oxygen Co., Ltd.; and Prest-O-Lite Co. of Canada, Ltd. Arthur V. Wilker has been elected president of National Carbon Co., Inc., and Canadian National Carbon Co., Ltd. Francis P. Gormely has been elected president of Electro Metallurgical Co., Electro Metallurgical Co. of Canada, Ltd.; Haynes Stellite Co., Michigan Northern Power Co. and Union Carbide Co. of Canada, Ltd. John D. Swain has been elected president of Electro Metallurgical Sales Corp. John R. Van Fleet becomes president of United States Vanadium Corp.

WORTHINGTON PUMP & MACHINERY CORP., Harrison, N. J., has purchased the Electric Machinery Mfg. Co., Minneapolis, Minn. The latter will continue to operate independently of the other Worthington activities. Its present executive personnel —Walther H. Feldmann, president; O. A. Soderstrom, vice president in charge of manufacturing; R. H. Olson, vice president in charge of sales; and Fred W. Hotchkiss, secretary and treasurer—will continue in those capacities. Walter D. Smith, Tulsa, Okla., has been named commercial vice president by Worthington.

TRUMBULL ELECTRIC MFG. CO., Plainsville, Conn., has established a separate Southeastern District, under the management of H. S. (Selby) Hill, for many years in charge of the company's Atlanta office. Associated with him are E. E. (Ed.) Frost



MERRICK WEIGHTOMETER

While material is smoothly moving along a conveyor, the MERRICK WEIGHTOMETER keeps a continuous and accurate record of weights. Total weight is available at a glance.

Applied to any size belt conveyor, either horizontal or inclined. The weightometer gives a simplified and dependable record of your production, without interrupting the flow of coal.

Write for Bulletin 375

MERRICK SCALE MFG. CO.
PASSAIC, N. J.

HERCULES AUGERS

Hercules Augers

Ideal for modern high speed electric drills—withstands whips and torsional strains. Flint hard and tough as whalebone. Drills faster—drills more holes with resharpening—outlasts four to five ordinary drills. Recommended for the hardest jobs. Up to 3" diameters—up to 16 ft. in length.

Black Diamond Augers

Carefully made from high-carbon crucible grade steel—heat-treated to obtain as much hardness and toughness as possible, to prevent broken tangs and points. Furnished up to 2" diameters—maximum over-all lengths 16 ft.

Standard Augers

Originally developed for use with hand drills. These augers work best at hand drilling drilling holes under stumps, and ditch blasting. Up to 2" diameters from oval steel, 7/16" thick, and maximum length of ten ft.

Call on us for any type auger you may require in your operations. We specialize in manufacturing the better grade alloy, heat-treated augers. Write, wire or 'phone for details concerning sizes, prices, deliveries, etc.

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SALEM OHIO

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"COAL TEETH"—the Prox alloy tool steel precision hardened double point bits —put more bite in any mining machine.
Direct bit cost per ton is a minor factor among others that overshadow its importance in appraising the real value of any particular type of coal cutting bit.
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Drop forged for strength, Superior Swivel and Single Link Couplings are built to stand the gaff. No welds to let go with resulting wrecks. Superior Couplings on your mine cars will prevent accidents and reduce haulage costs. Order Superior Couplings for your replacements and specify them on new equipment.

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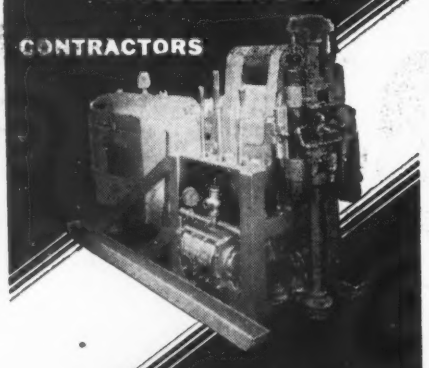


Mott Type "A" Oil Hydraulic 1500 Ft. Cap., 2¼" Diameter Core.

• Coal and all mineral properties tested—using our light gasoline drills. They save fuel and moving costs . . . guarantee satisfactory and proper cores.

Pre-pressure grouting for mine shafts. ground solidification for wet mine areas by our stop grout method. Water wells and discharge holes drilled and grouted . . . electric drills for inside mine drilling.

MOTT CORE DRILLING CO.
HUNTINGTON • WEST VIRGINIA

and A. T. (Al) Allison, who have been operating out of Nashville and Charlotte respectively for a number of years, and Hugh N. Delinger in New Orleans, replacing "Mike" Turner, now located in the Cincinnati district, with headquarters in the Norwood factory.

•

Trade Literature

COAL CLASSIFIER—Roberts & Schaefer Co., 307 North Michigan Ave., Chicago 1, Ill. Bulletin 162 gives detailed information about the R and S Hydrotator.

CONVEYOR SYSTEMS—Robinson Air-Activated Conveyor Systems Division of Morse Boulger Destructor Co., New York 17, N. Y. Bulletin 310 cites the following advantages of Robinson air-activated conveyor systems: low first cost, low operating cost, low maintenance cost, flexibility, cleanliness and rapid handling.

INDUSTRIAL CLOTHING—B. F. Goodrich Co., Akron, Ohio. Catalog Section 12,000, on industrial clothing coated with rubber or rubberlike materials, illustrates and describes in detail the design and construction of Goodrich brand clothing.

RATCHET WRENCH—Greene, Tweed & Co., Bronx Blvd. at 238th St., New York 66, N. Y. Bulletin F-10, on the Favorite reversible ratchet wrench, graphically describes the principal features of this tool.

FOLDING LADDER—Duo-Safety Ladder Corp., Oshkosh, Wis. Bulletin Form G20 depicts features and uses of the Series G heavy-duty lightweight folding ladder.

TRANSFORMERS—General Electric Co., Schenectady, N. Y. Bulletin GEA-4193 cites the benefits of all-purpose Pyranol transformers in safety, savings and reliability.

PORTABLE ELECTRIC DRILL—Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill. Brochure covers the history, development, features and specifications of the recently introduced Thor plastic-housed portable electric drill.

MINE CONVEYORS—Barber-Greene, Aurora, Ill. Book 66 describes and pictures a variety of conveyor equipment for use in conveyor mining as well as in sorting and reclaiming coal.

GAS AND ELECTRIC WELDING SUPPLIES—Air Reduction Sales Co., 60 East 42d St., New York 17, N. Y. Revised price list, superseding similar previous lists, gives detailed information on sizes, dimensions, weights, stock numbers, forwarding data and recommended uses for products. Products in the revised list include gas welding rods made in a wide range of metals, types and sizes for all welding requirements; also hard-facing alloys, brazing alloys, fluxes, helmets, goggles, gloves, aprons, welding cable, cable lugs and ground clamps. Among new items described are Airco No. 66 welding helmet, Suregrip rod saver and Atlas Model A dual-tool for cleaning welds.

ELECTRICAL SYMBOLS—I-T-E Circuit Breaker Co., 19th and Hamilton Sts., Philadelphia 30, Pa. Bulletin 4403 is a wall chart of A.I.E.E. standard symbols for power, control and measurement. These fundamental symbols portray component

Send a V-MAIL today
Keep up morale

Home front news is vital on the fighting front. Write a fighting man today.

Hotel Mayfair
SAINT LOUIS
Air-conditioned Noiseproofed

QUALITY MARLO PACKING

METALLIC & SEMI-METALLIC
PACKING
for
MINE PUMPS

"The Packing that gets the Repeat Orders"

For deep mine pumps. Resists acid mine waters. Keeps grit out of stuffing box. Three types.

• MARLO ALL PURPOSE METALLIC PACKING
Best ever devised. Will not freeze at 70° below. Soft, pliant, like fibrous types, yet easier to handle. Won't cut, score or corrode moving parts.

• "TWIN-TWIST" SEMI-METALLIC PACKING
Metal strands twisted with asbestos. Anti-frictional. Durable. Economical. Remarkable compressability. Never hardens. For temperature up to 550° F.

• "RED WATER" SEMI-METALLIC PACKING
Most modern development for all hydraulic applications. A solid-packing vegetable fibre combined with metal strands. Retains form under any conditions.

Let us serve you!

THE MARLO COMPANY
38 HOWARD ST.
NEW YORK, N. Y., U. S. A.

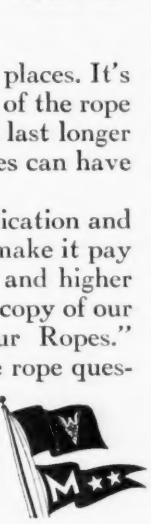
Old Friend of the Outfit

Pulling a jeep out of a submerged shell hole while under enemy fire takes plenty of you-know-what. True, it's only one of hundreds of jobs an invasion force may be called upon to do. And, it's just one of scores of ways in which good, dependable wire rope comes in mighty handy.

On the far-flung battlefronts—and at home, too—men of action know that even under the most adverse conditions they can count on the performance of Wickwire Rope.

Right now we are making more rope than ever before—but it has more jobs to do in more places. It's smart to take good care of the rope you now have so it will last longer and so our fighting forces can have more for *their* work.

Proper selection, application and usage of wire rope will make it pay dividends in longer life and higher production. Write for a copy of our free book "Know Your Ropes." And, if you have a wire rope question, we'll be happy to be of service. Write Wickwire Spencer Steel Company, 500 Fifth Ave., New York 18, N.Y.



HOW TO CONSERVE WIRE ROPE

Thousands of wire rope users—old hands and new—have found "Know Your Ropes" of inestimable value in lengthening life of wire rope. Contains 78 "right and wrong" illustrations, 40 wire rope life savers, 20 diagrams, tables, graphs and charts.

SEND FOR YOUR FREE COPY

Send your wire rope questions to:

WICKWIRE SPENCER STEEL COMPANY

500 FIFTH AVENUE, NEW YORK 18, N. Y.

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parts or elements, such as coils, connections, contacts, instruments, transformers, etc., and can be combined in various ways to represent complete electrical devices.

SAVING STEEL FROM RUSTING—New Jersey Zinc Co., 160 Front St., New York 7, N. Y. Bulletin summarizes developments in zinc pigments in the protection of iron and steel. Focused chiefly on primers and shop coats, the principles involved, it is pointed out, apply to complete systems.

GRAVITY FEED OILERS—Trico Fuse Mfg. Co., Milwaukee 12, Wis. Bulletin 26-B illustrates and describes a modernized streamlined oiler with a crystal clear reinforced plastic reservoir that is light in weight and has no gaskets to leak. The dustproof style has an oil filter that can be removed for easy cleaning in less than 5 seconds without tools or mess.

COMBUSTION CONTROL—Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa. Catalog N-O1M-163 (revision of 1939 edition) describes the meter-max quick-acting system of combustion control for boiler furnaces with illustrations of design features said to contribute to the equipment's reliability.

TRACK TACKLE—Portable Lamp & Equipment Co., 420 Blvd. of Allies, Pittsburgh 19, Pa. Folder deals with entire line of track tackle. Each piece of equipment, from the newly designed throw level switch signal to the "Terrier" stemming mixer and extruder, is graphically illustrated to explain the appearance and application. In addition, each item is given a catalog number on transmission rails, automatic car holders, mine-car derails, safety blocks, rail splicers, switch signals, holding and running skids, etc.

TRUCK-DRIVER TRAINING — White Motor Co., Cleveland 1, Ohio. Drivers' Manual supplements personalized service plan for driver training, outlining the necessary steps in the course.

TRACTOR GRIP LUGS—Allied Steel Products, Inc., Cleveland, Ohio. Bulletin Form GL describes the Bulldog tractor grip lug, said to be easily welded to any shape or size grouser shoe, providing a retread for all track laying or crawler types of equipment.

PIPE JOINT—Dresser Mfg. Co., Bradford, Pa. Bulletin Form 441A emphasizes advantages of Bellmaster Style 85 mechanical joint, said to be light, strong and compact.

FIRE-RETARDANT—Albi Firepel Corp., 9 Park Place, New York 7, N. Y. Bulletin gives the story of Albi-Firepel "S," fire-retardant coating, telling what it is, how it works and how and where to apply it.

"PENNSYLVANIA" TYPE "K" SINGLE ROLL COAL CRUSHER

With this advanced design, in rugged STEELBUILT construction, far more accurate sizing is possible to meet Code requirements through quick adjustability, in a range from ¾" to 8".

Further—real protection is provided by improved Safety Toggle Equipment, which quickly passes Tramp Iron, and instantly returns Breakerplate to crushing position.

Seven (7) sizes afford a capacity range from 50 to 1000 tons per hour.

Send for Bulletin No. 2006.

***Also,—* "PENNSYLVANIA" BRADFORD BREAKERS, BRADMILLS, GRANULATORS, HAMMERMILLS, IMPACTORS**

PUT YOUR COAL PREPARATION PROBLEMS UP TO US.

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whose cards appear on this page with the confidence justified by the offering of these special services nationally.

PIPING MAINTENANCE—Crane Co., Chicago. Bulletin AD1556, "Piping Pointers," is a guide to industrial maintenance men, giving hints on handling valves, fittings and pipe; how to install valves and joints, etc.

SHOVEL CONTROL—General Electric Co., Schenectady, N. Y. Bulletin GEA-4161 tells how G-E amplidyne improves electric shovel operation, giving, it is said, increased production, improved digging characteristics, smooth and powerful driving power, reduced excessive stress on parts, easier operation and decreased maintenance.

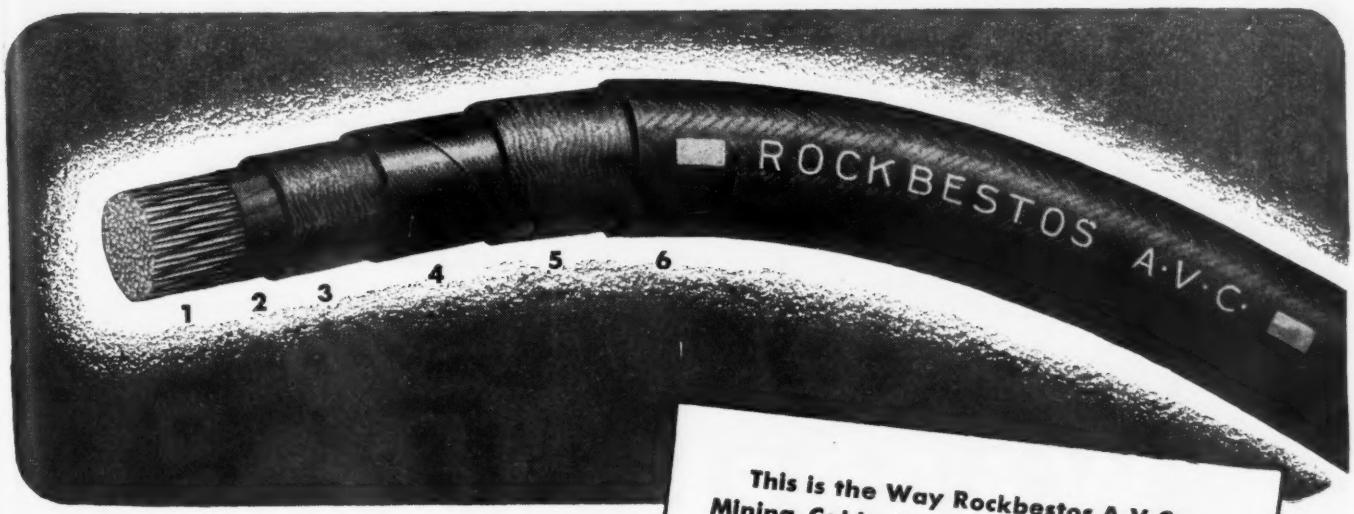
OILERS—Trico Fuse Mfg. Co., Milwaukee, Wis. Bulletin 24-A and 25-A describe an automatically controlled visible oiling method for ring or ball bearings, shafts, gear and pump housings, etc. Suggestions on how to end bearing failures, reduce motor burnouts, stop needless shutdowns for hand oiling, eliminate fire and accident hazards, etc., are given.

JACKS—Templeton, Kenly & Co., 1020 South Central Ave., Chicago 44, Ill. Catalog and manual of Simplex lever, screw and hydraulic jacks, No. 44, gives pictures, descriptions, dimensions, capacities and weights of hundreds of jacks in sizes from 3 to 100 tons capacity. Also contained are operating and maintenance instructions on all types of industrial jacks. Feature pages show jacks in war applications and list jacks by types for ready reference.

A simple method for Keeping Mining Equipment

Up-at-the-face producing...

Install ROCKBESTOS A.V.C. in cutters, loaders and locomotives



Getting out coal is as important to the war effort as getting out munitions—and one sure way to keep mining equipment "up-at-the-face" producing for victory is to use Rockbestos A.V.C. Mining Cable for connections between controllers and resistors, coil connections and motor leads.

Tested and proved by more than 15 years of actual use by equipment manufacturers and mine electricians, Rockbestos A. V. C. Mining Cable stands up where other cables fail. The tough *permanent* impregnated asbestos insulation is heatproof and flameproof—it takes the heat of resistor grids and won't bake brittle under conductor-heating overloads — won't crack or open up under vibration — won't ignite or carry flame — and won't swell, rot or flow when in contact with oil, grease or alkalies.

Keep your mining equipment out of the shops — for internal wiring use Rockbestos A. V. C. Mining Cable. Write for information and samples.

ROCKBESTOS PRODUCTS CORPORATION
P. O. Box 1102, New Haven 4, Connecticut

ROCKBESTOS A.V.C.

The Cable with Permanent Insulation

This is the Way Rockbestos A.V.C. Mining Cable is Permanently Insulated

1 Flexible tinned copper conductor, perfectly and permanently centered in helically applied insulation.

2 Paper separator makes stripping easy; prevents insulation from sticking to conductor.

3 Felted asbestos insulation, impregnated with heat, flame and moisture resisting compounds, withstands conductor heating overloads and won't dry out, bake brittle or burn.

4 Varnished cambric for high dielectric strength and added moisture resistance, protected from heat, flame and oxidation by two felted asbestos walls.

5 Outer felted asbestos wall, also impregnated with heat, flame and moisture resistant compounds, serves as an effective barrier against high ambient temperatures and flame.

6 Heatproof, fireproof asbestos braid, resistant to moisture, oil, grease and alkalies, is diametered to properly fit bushings.

For sizes and diameters refer to McGraw-Hill Coal Mining Catalogs or write to Rockbestos Products Corporation, P. O. Box 1102, New Haven 4, Conn.

122 different wires and cables have been developed for severe operating conditions by Rockbestos.

PERMANENTLY INSULATED ROCKBESTOS WIRES AND CABLES

ORDER FROM THESE JOBBERS—SPECIFY "ROCKBESTOS A.V.C."

BECKLEY, W. VA.:	Beckley Mach. & Elec. Co.	EVANSVILLE, IND.:	Evansville Elec.& Mfg. Co.	MIDDLESBORO, KY.:	Rogan & Rogan Co.
BIRMINGHAM, ALA.:	Moore-Handley Hdwe. Co.	FAIRMONT, W. VA.:	Fairmont Supply Co.	PITTSBURGH, PA.:	Upson-Walton Co.
BLUEFIELD, W. VA.:	Superior-Sterling Co.	HUNTINGTON, W. VA.:	Banks-Miller Supply Co.		Westinghouse Elec.Supply Co.
CLEVELAND, OHIO:	Upson-Walton Co.	LOTHAIR, KY.:	Mine Service Co.	SCRANTON, PA.:	Penn. Elec. Engineering Co.
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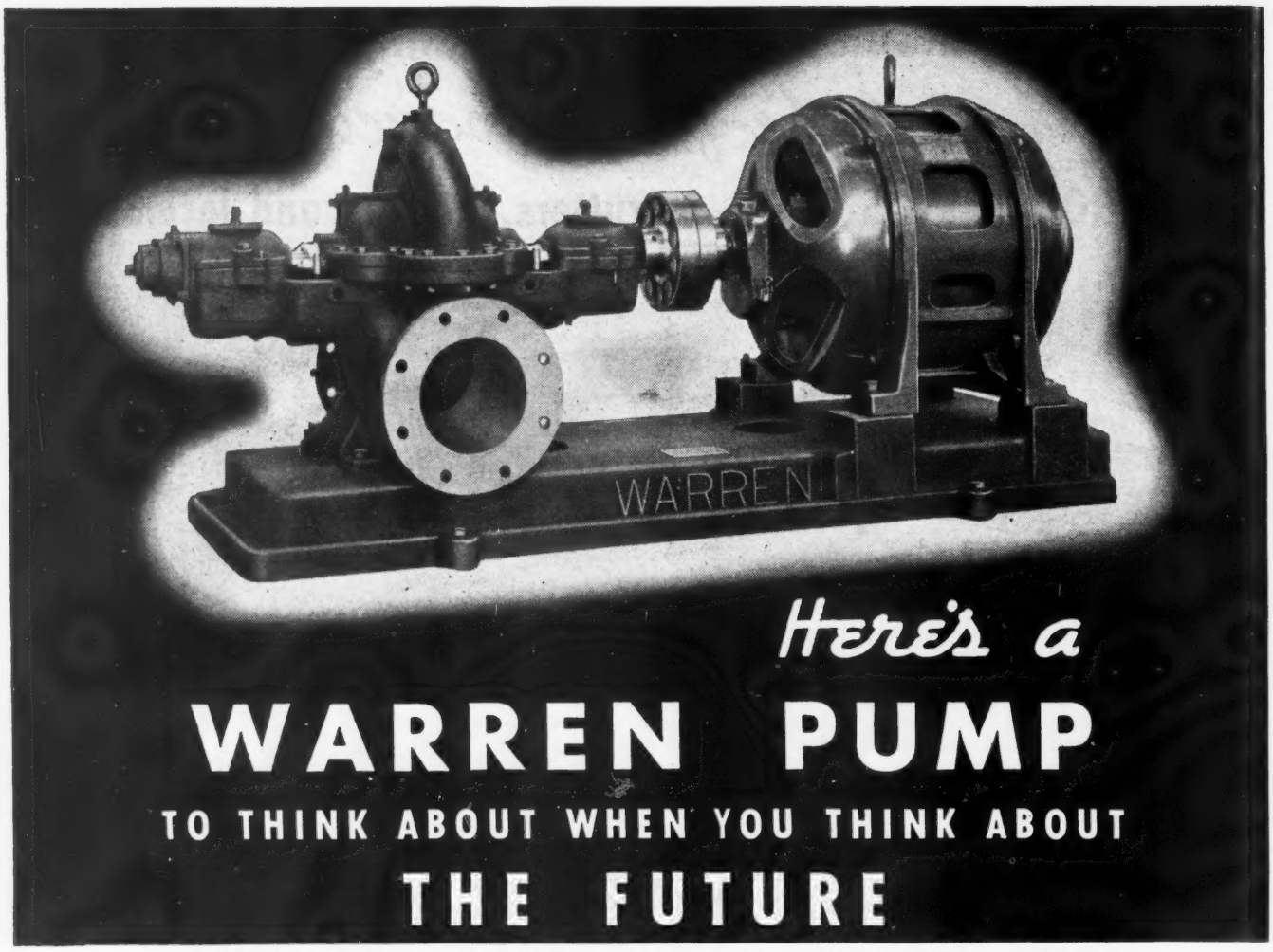
FOR VICTORY — GET OUT COAL and INVEST IN U. S. WAR BONDS



Here's a

WARREN PUMP

TO THINK ABOUT WHEN YOU THINK ABOUT THE FUTURE

SINGLE STAGE • DOUBLE SUCTION • TYPES DM and DL

Check these features:

CASING: Pump casing is of the double suction, volute type divided on the horizontal center-line. Suction and discharge nozzles are cast integral with lower half. Bearing brackets on smaller sizes are cast integral with lower half of pump casing. On larger sizes brackets are securely bolted and dowelled to the pump casing. Water passages are designed to produce smooth flow with gradual changes in velocity. By removing case cover and bearing caps, the entire rotating member may be removed for inspection or repair without disturbing pipe connections.

IMPELLER: The impeller is of the enclosed type, accurately machined and balanced to insure freedom from vibration. All water passages are hand filed and renewable impeller rings are standard equipment.

SHAFT: Shafts are machined and finished by grinding to accurate dimensions and are of ample diameter to safely transmit the required power without undue bending or twisting.

CASE RINGS: Case rings are securely held in place by means of a tongue and groove lock in the lower half of the pump casing. This construction maintains parallel clearance spaces between impeller and case rings and secures case rings against rotation and lateral movement.

BEARINGS, RADIAL: Bearings are of the split type, ring oiled, lined with genuine babbitt, bolted together and held in place by the bearing cap which also locks bearings against rotation. Bearings may be replaced without disturbing the rotor.

BEARING THRUST: All pumps are fitted with a ball thrust bearing of the double row angular contact type, designed to take thrust in either direction.

PACKING GLANDS: Packing glands are of the split type, bolted together and can be removed without disturbing other parts.

TESTING: Every Warren pump is given a running test and all guarantees verified before shipment. Each casing is subjected to a hydrostatic test pressure at least 50% in excess of the operating pressure.

FOR COMPLETE SPECIFICATIONS AND RATINGS ASK FOR BULLETIN 227-1

WARREN STEAM PUMP COMPANY, INC.

WARREN, MASSACHUSETTS

Answers to Everyday Questions about PREformed WIRE ROPE

1 ***Is PREformed a lay of rope?***

2 ***Is PREformed a special construction?***

3 ***Just what does PREformed mean?***

4 ***How shall I mark my orders to get PREformed?***

These are questions wire rope users are asking. Here are answers to everyday questions we receive.

First, let us be reminded that there are two kinds of rope. One is non-preformed wire rope, the kind that has served users for many years. Then there is PREformed, the kind which is newer, better, and longer lasting. Because it is a newer type rope, because it does a much better job for users, there are many questions asked about it. Let's consider a few.

FIRST . . . *"Is PREformed a lay of rope?"*

No. PREformed does not refer to a lay of rope. Lay refers to the twist or helical form which is characteristic of *all* wire rope. A rope may be Lang Lay, Right Lay, Left Lay, Reverse Lay . . . and each of these lays may be made either PREformed or non-preformed.

Lang Lay ropes should always be PREformed to counteract the tendency towards twisting, because wires and strands are both laid in the same direction in Lang Lay ropes. Further information on Rope Lay is given in the new Macwhyte Wire Rope Catalog, G-15.

SECOND . . . *"Is PREformed a special construction?"*

No, PREformed is not a special construction. Construction refers to the number and arrangement of wires in the rope . . . such as 6 x 17 (six strands of 17 wires each), 8 x 19 (eight strands of nineteen wires each), and so on. These constructions can refer to either PREformed or non-preformed wire rope. (For complete data on constructions, see Catalog G-15.)

THIRD . . . *"Just what is PREformed?"*

Macwhyte PREformed wire rope is the proper size, grade and construction you need, *PLUS*. This *plus* refers to the PREforming, a process which forms the wires and strands into a spiral, so that wires and strands lie naturally in place with a minimum of internal stress.

Illustration above tells the story. Notice how the wire has a special shape? It has been PREformed. When the rope is closed (put together in the closing machine), both wires and strands naturally fall into position in the rope.

Illustration above points to the end of a PREformed rope showing how wires lie naturally in place even though no seizing is there to hold them.

The result is a wire rope that is more flexible and that more quickly adapts itself to the equipment on which it is used. Thus, literally, PREforming means better PER-forming on the job.

A PREformed rope is safer to handle, too, because broken wires (which will happen after *long* usage) do not wicker out as in non-preformed wire rope.

FOURTH . . . *"How should I mark my orders to get PREformed?"*

Just add the words "Macwhyte PREformed" to your specifications. Like this, for example:

1,250 feet 1" 6 x 19 Lang Lay with IWRC, Macwhyte PREformed Monarch Whyte Strand wire rope.

If you leave out "Macwhyte PREformed," the specification then becomes a non-preformed wire rope specification. The reason? When PREformed is not mentioned on the order, it is a standard practice to supply non-preformed.

FIFTH . . . *Internal Lubrication, too!*

And a bonus *Plus* feature of Macwhyte PREformed wire ropes is *internal lubrication*. Not only are wires and strands PREformed, but each wire in the strands is coated with an elastic, non-drying film of lubricant, as explained on pages 10 and 11 of G-15 catalog.

We have been making wire rope for equipment like yours for many, many years. The benefit of that experience is yours for the asking. You can be assured, too, that when you select Macwhyte you are not only getting "the correct rope for your equipment," but also a personal interest in helping you get the *most* out of *your* rope.

MACWHYTE PREformed WIRE ROPE — Plus Internal Lubrication Selected Steels Tested-Proved

The correct rope for your equipment

NO. 741

MACWHYTE COMPANY

Wire Rope Manufacturers

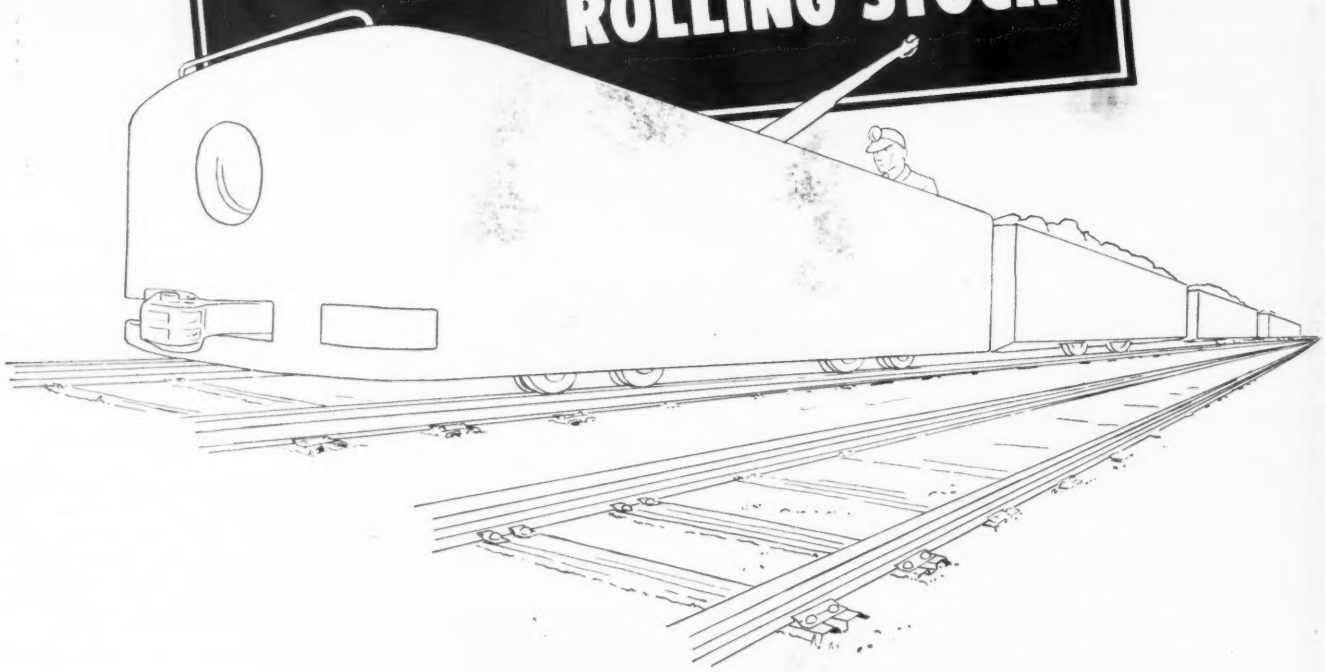
ARMY E NAVY

2931 FOURTEENTH AVENUE KENOSHA, WISCONSIN

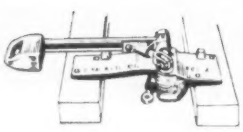
Mill Depots: New York · Pittsburgh · Chicago · Fort Worth · Portland · Seattle · San Francisco. Distributors throughout the U.S.A.

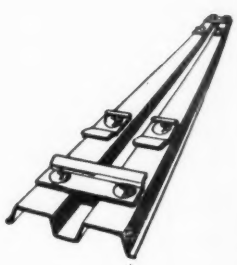
MACWHYTE PREformed and Internally Lubricated Wire Rope · MONARCH WHYTE STRAND Wire Rope · MACWHYTE Special Traction Elevator Rope · MACWHYTE Braided Wire Rope Slings · MACWHYTE Aircraft Cables and Tie-Rods · MACWHYTE Stainless Steel Wire Rope · MACWHYTE Monel Metal Wire Rope

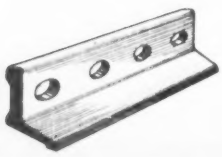
IT TAKES STOUT TRACK TO HANDLE FASTER, HEAVIER ROLLING STOCK

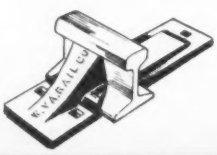


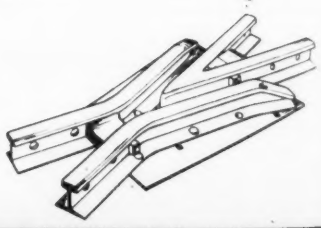
• Your investment in expensive cutting and loading equipment will pay dividends when bigger capacity mine cars are spotted at the delivery end when needed. This calls for *speed* all along the haulage way. Unless your track equipment was specifically purchased to handle today's heavier loads and bigger locomotives, it is likely that it will cause delays. Avoid down time . . . prevent loss of production and man hours by check *now*. Replace every doubtful item with West Virginia track equipment and replacement parts. A West Virginia Engineer will be glad to inspect your haulage ways with you and make repair and replacement recommendations.











WEST VIRGINIA STEEL & MFG. COMPANY

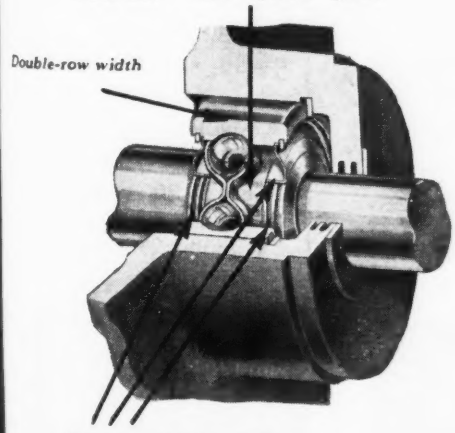
Formerly The West Virginia Rail Company

HUNTINGTON (I) WEST VIRGINIA

ROBBINS & MYERS FEATURE
NORMA-HOFFMANN "CARTRIDGE" BEARINGS

As Standard in R & M Uni-Shell MOTORS

"BETTER BEARINGS FOR LONGER MOTOR LIFE"


Extra large grease reservoir, factory-packed with "NORMA STABILITY-TESTED," water-repellent grease.
Double-row width
Grease grooves and flanged, removable metal seal, on both sides, forming a wearless labyrinth barrier against escape of lubricant and entrance of foreign matter.

From the Robbins & Myers "UNI-SHELL" MOTOR Catalog:— "A motor is as old as its bearings. Good bearings and a properly designed lubricating system are the first steps in insuring long bearing life without excessive wear....The standard ball bearings are completely sealed, double-row width. Such bearings have an extra grease reservoir, insuring years of trouble-free operation."

From a Robbins & Myers "UNI-SHELL" MOTOR Advertisement:— "One of the two main reasons for motor deterioration is bearing wear. That is why we have gone "all out" on bearing standards, types and alignment."

From a Robbins & Myers Letter:—"The excellent record we have obtained from the thousands put in service makes us believe that such a position is justified."

Write for the "CARTRIDGE" BEARING catalog. Let our engineers work with you.

NORMA-HOFFMANN BEARINGS CORP'N, STAMFORD, CONN. . . . FOUNDED 1911

TO WIN THE WAR: WORK — FIGHT — BUY WAR SAVING BONDS!

How to stretch the life of those precious cables

• There's a bigger-than-ever production quota to be met this year, and electric cables are going to play a mighty important part in the result. Don't wait until those vital cables are beyond repair – you know how hard they are to replace. Keep them in the fight with tough, double-grip Ruberoid Insulating Tape.

Ruberoid Insulating Tape does more than a patch-up job, it practically renews cable! Nothing like it for safe, fast, tight splicing and insulating. Another thing, it *lasts,* because it's built to withstand the roughest treatment. Your mine supply house carries it—make sure you have it on hand by getting in an order today.

Only RUBEROID INSULATING TAPE has all these 7 features

1 Double grip—both sides adhesive
2 Great tensile strength . . . tough
3 Won't tear, ravel or pucker
4 Resists abrasion
5 Acid- and alkali-proof
6 Extra thick . . . one layer insulates
7 Exceeds A.S.T.M. specifications by 300% in adhesiveness, 26% in tensile strength, 290% in dielectric strength

OTHER RUBEROID PRODUCTS FOR COLLIERIES

ROLL ROOFING & SHINGLES
INSULATING PAINTS
BUILT-UP ROOFS
ASBESTOS INSULATIONS
ASBESTOS AND MAGNESIA
PIPE COVERINGS
ROOF COATINGS AND PLASTIC
CORRUGATED ASBESTOS-CEMENT
ROOFING AND SIDING
STONEWALL BOARD

RUBEROID'S INSULATING TAPE

The RUBEROID Co., *Executive Offices,* 500 Fifth Ave., New York 18, N.Y

● *Built by* THE JEFFREY MFG. CO.

Shooting fresh air to miners

SKF

BALL AND ROLLER BEARINGS

Looking down the muzzle of this cannon-shaped fan will give you an idea of the amount of air shot into the shaft.

This 900 r.p.m., 500 h.p. Aerodyne Fan, when operating at full speed, has a potential capacity of 350,000 c.f.m. at 8″ pressure.

Radial and thrust load carriers, SKF Spherical Roller Bearings keep their peak load carrying capacity because they have inherent aligning characteristics. The only attention they need for a long life is occasional lubrication.

Give any machine an SKF Bearing, and you give it a full measure of Performance. 5575

SKF INDUSTRIES, INC. • FRONT ST. & ERIE AVE. • PHILADELPHIA 34, PA.

Sturdy

ENOUGH TO MEET THE . . . "UNPREDICTABLE"

Constantly subject to all the known stresses and strains of present-day production, your power transmission also must be sturdy enough to meet and conquer the "unpredictable" . . . those unforeseen factors which are encountered daily.

Let us give you the proved benefit of our nearly 90 years' experience in supplying truly satisfactory Power Transmission Equipment.

T. B. Wood's

SONS COMPANY
CHAMBERSBURG, PA.

LONG LIFE LINE

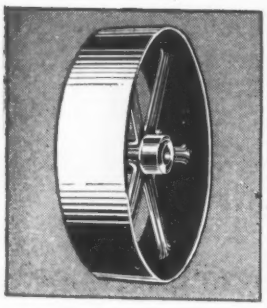
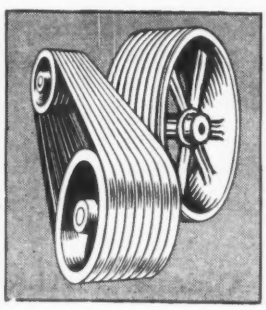
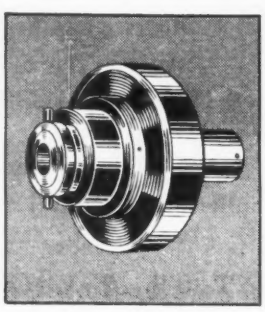
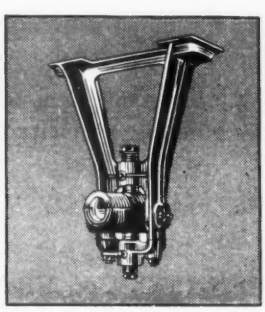
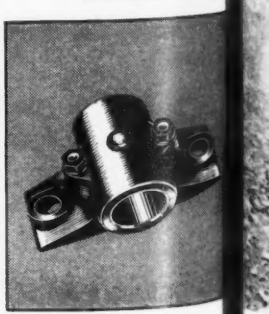
EVERYTHING IN TRANSMISSION

BEARINGS — COLLARS — CLUTCHES — COUPLINGS — CONTACTORS — HANGERS — PILLOW BLOCKS — PULLEYS — V-BELT SHEAVES AND COMPLETE DRIVES

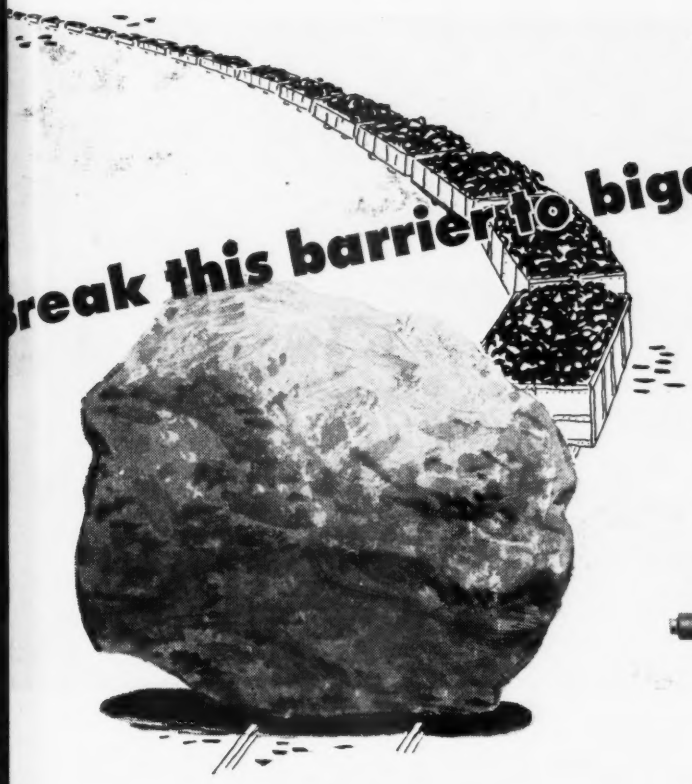
BRANCH OFFICES

387-391 ATLANTIC AVE., BOSTON, MASS.
83 PLANE STREET, NEWARK, N. J.
425 FIRST AVENUE, PITTSBURGH, PA.

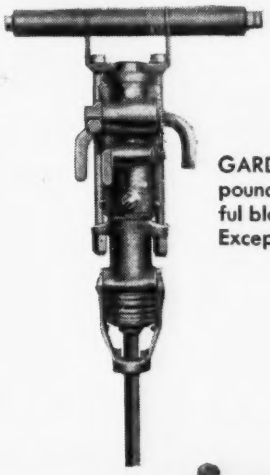
Back the 5th War Loan Drive Buy another Bond today

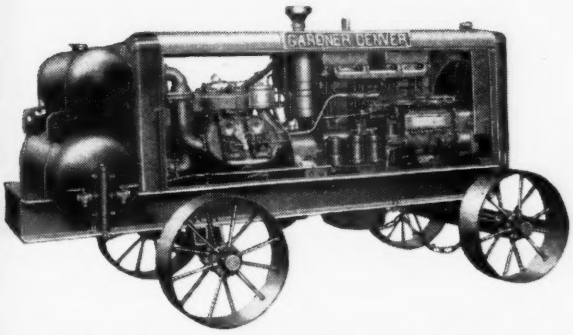
reak this barrier to bigger tonnages - FASTER



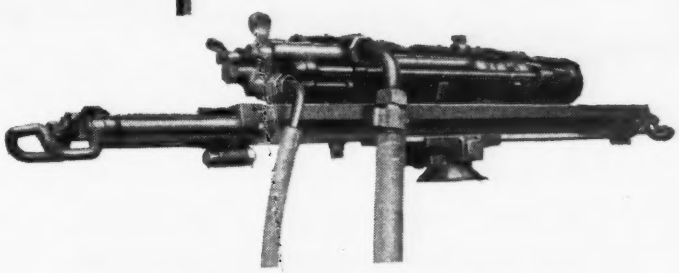
Wherever you find it . . . in strip mines or deep mines . . . rock is a barrier to bigger tonnages. The consistently *better* performance of Gardner-Denver equipment can help you break down that barrier faster . . . can help you get the rock out quicker. Take advantage of the proved ability of Gardner-Denver equipment to make rock "fly" . . . an ability that can help you increase your tonnage and cut costs.



GARDNER-DENVER S-33 DRILL. This 31 pound, easy-handling drill delivers a powerful blow that speeds drilling in rock or coal. Exceptional hole-cleaning ability.



ARDNER-DENVER PORTABLE COMPRESSORS are built in a de range of capacities to fit every strip mining need. Completely water-cooled for dependable performance under all eather conditions, they are designed to furnish an unfailing pply of compressed air.



GARDNER-DENVER DRIFTERS. Designed to assure speedy drilling with a minimum of vibration, these continuous feed drifters help you drive your haulage ways —faster. Maintenance costs are extremely low.

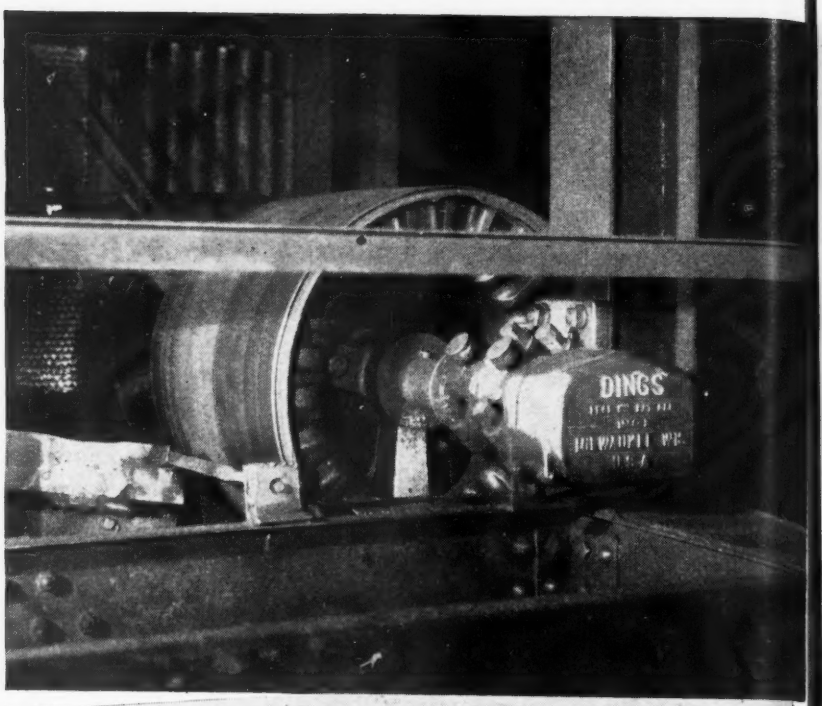
GARDNER-DENVER WAGON DRILLS are especially suited for smooth, fast moving over rough ground. They assure speedy drilling through tough overburden and are noted for their powerful hole-cleaning ability.

For complete information on Gardner-Denver equipment that can help you get bigger tonnages, write Gardner-Denver Co., Quincy, Ill.

Since 1859

GARDNER-DENVER

COSTS LESS TO TAKE THE IRON OUT *than it does to leave it in!*



ACCOUNT NO.

SHEET NO. _____ CREDIT LIMIT NAME OPERATING EXPENSES

RATING ADDRESS MAGNETIC PULLEY

BUSINESS

DATE	ITEMS	FOLIO	DEBITS	CREDITS	BALANCE
1943					
Dec. 31	Depreciation (10 year basis)	J 365	154. 10		
	Electricity	CD 869	85. 54		
	Cash received for tramp iron recovered	CR 651		243.00	Cr. 3.36

MANY operators buy Dings Magnetic Pulleys because they think it's a good investment to protect machinery and ship stoker coal iron-free from the mine. But few probably ever expected to do this at no cost, let alone make a profit. Yet, Mr. C. B. Scholl, Chief Engineer, Boone County Coal Corp., Sharples, W. Va., has cost records to prove that on the basis of depreciating his Dings Pulley in only 10 years that the salvage value of iron it recovered was enough to pay for the pulley and net a profit of $3.36 per year besides! There were no repair costs on the pulley during the entire 10 year period.

And, remember, that many Dings Pulleys are still functioning perfectly after 20 to 40 years' service which makes this record all the more impressive.

These figures give every mine operator something to think about. It's worth spending money to get the benefits of Dings Pulleys — why be without them when it doesn't cost anything? Literature on request.

Dings MAGNETIC SEPARATION HIGH INTENSITY

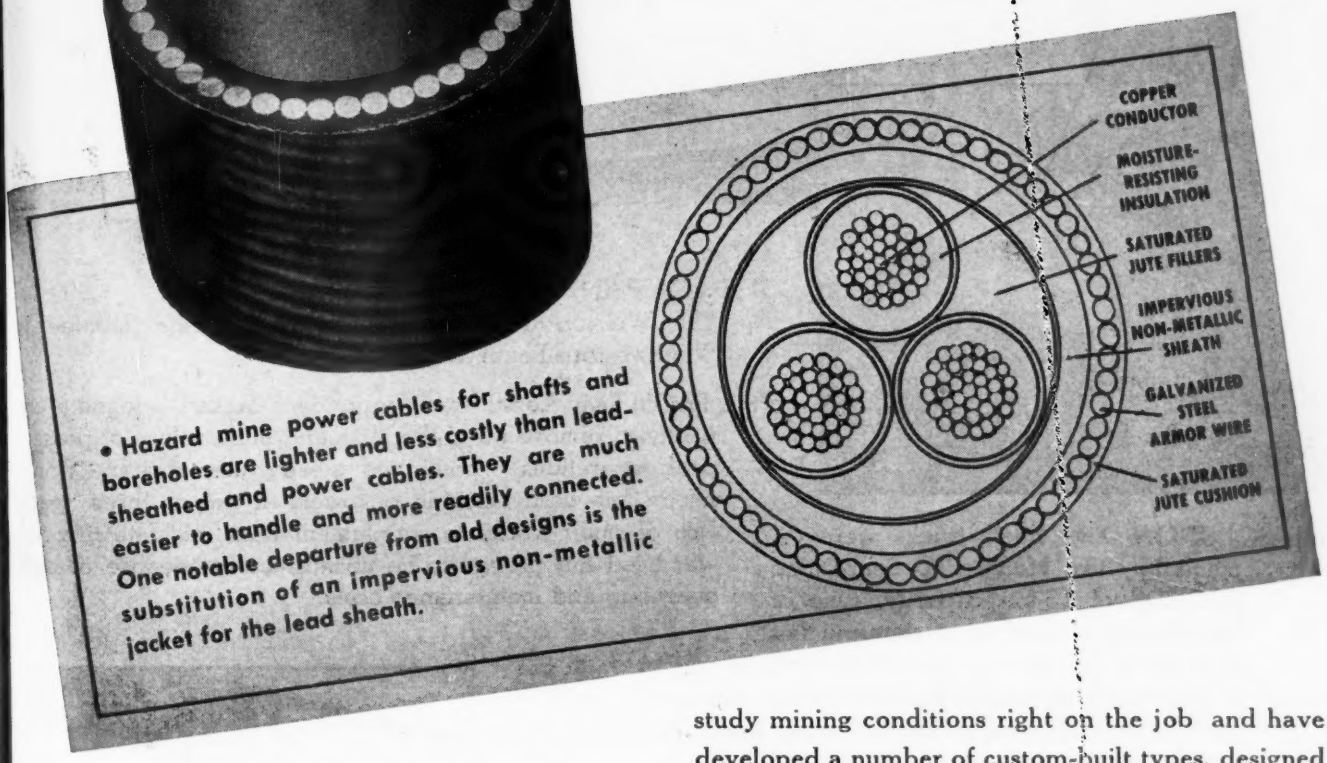
DINGS MAGNETIC SEPARATOR CO.

506 E. Smith St. • Milwaukee, Wisconsin

World's Largest Exclusive Builders of Magnetic Equipment. Est. 1899

Magnetic Pulleys and Drums . . . Suspension and Spout Magnets

HAZARD MINE POWER CABLE



• Hazard mine power cables for shafts and boreholes are lighter and less costly than lead-sheathed and power cables. They are much easier to handle and more readily connected. One notable departure from old designs is the substitution of an impervious non-metallic jacket for the lead sheath.

Electrical cables for mining use must be designed for the job—they must be able to stand abuse, to resist moisture, to provide protection from mine acids. And certain mines may have unusual conditions that require entirely new solutions in cable design.

Okonite's Hazard Insulated Wire Works Division was fostered and nurtured in the heart of the Anthracite Coal Region. It is only natural therefore that much of its development and production should be connected with mining. Hazard engineers constantly study mining conditions right on the job and have developed a number of custom-built types, designed especially for the mining industry.

This intimate contact is a unique advantage and, as a result, Hazard electrical cables are known throughout the mining industry. If you are contemplating electrification or are already using electric power, Hazard engineers will be glad to consult with you regarding the types of cable that will assure maximum safety and reliability.

HAZARD INSULATED WIRE WORKS
DIVISION OF THE OKONITE COMPANY
Works: Wilkes-Barre, Pa. • Offices in Principal Cities

HAZARD

ARMY E NAVY

Insulated Wires and Cables for Every Mining Use

3210

BUY U. S. WAR BONDS—Every Payday All Hazard Employees BUY U. S. WAR BONDS

W

The Case of "SLATE DISPOSAL HEADACHES"

How a large bituminous coal producer solved a most troublesome problem

THE COMPANY AND PROPERTY: The Weirton Coal Company, Isabella Mine, located in Southwestern Pennsylvania.

THE PROBLEM: Aerial tram equipment lacked adequate capacity to remove all of the slate and mine refuse of present peak operations — continued steady use of tram would necessitate costly moving of towers in two or three years. Use of small trucks to supplement tram for slate disposal was tried but proved to be unsatisfactory because of high operating and maintenance costs.

THE SOLUTION: Five small trucks were replaced by two Model 2FD Rear-Dump EUCLIDS of 15-ton capacity. One of the Euclids is used as a standby unit because of the six day 'round the clock operation. Both the aerial tram and second Euclid are put into service only at peak periods, a single Euclid being adequate to handle average output of slate.

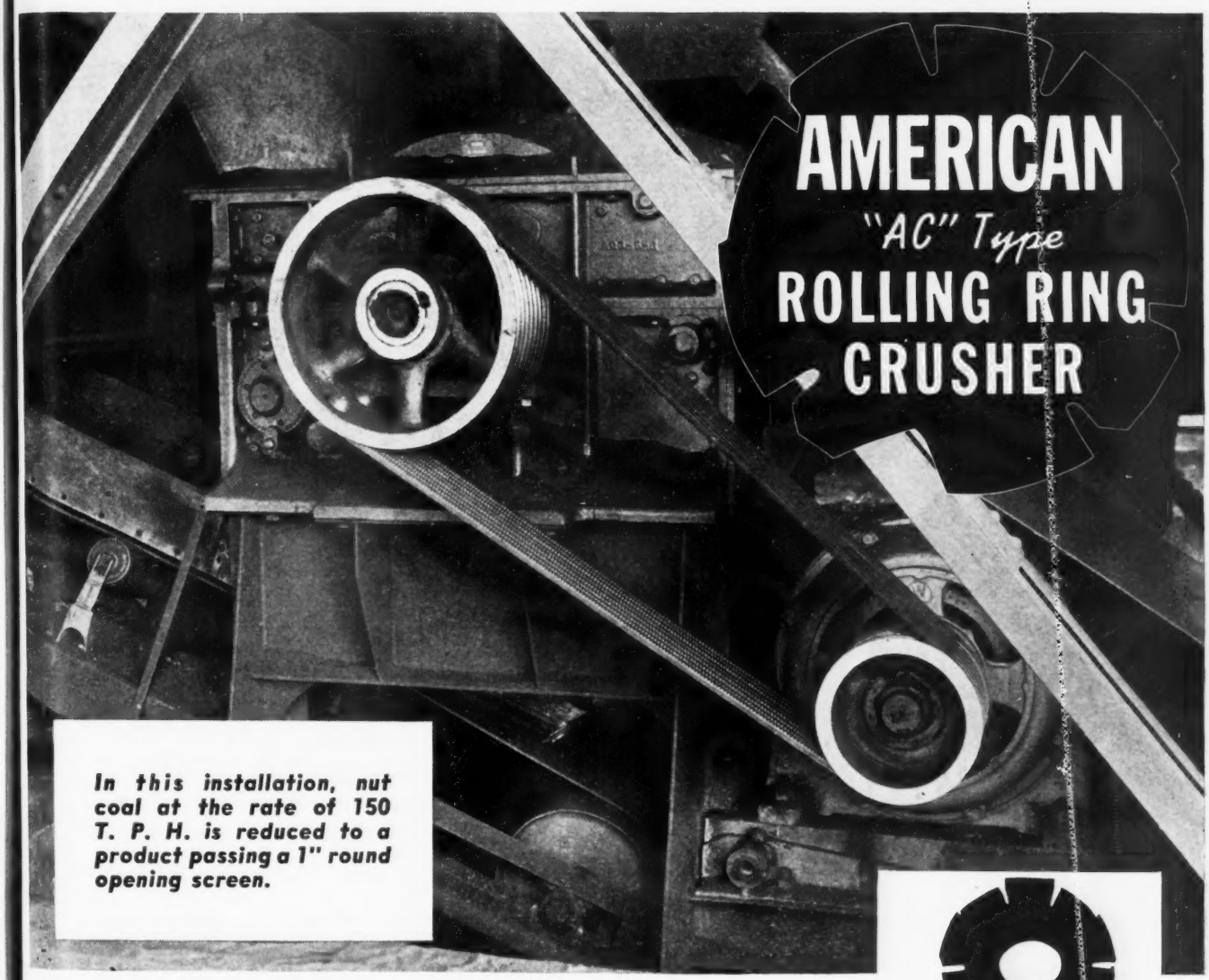
THE RESULT: The company has reduced their cost of hauling and dumping slate and refuse, and has greatly prolonged the usefulness of the aerial tram in its present location. The standby Euclid is used one or two shifts each week to haul coal for the company's beehive coke ovens. When the two Euclids were purchased to replace the small trucks, it was thought that steady operation of the aerial tram would have to be continued, but the speed and capacity of the Rear-Dump EUCLIDS has made tram use unnecessary except at peak periods.

● If you have a problem of moving large amounts of earth, ore, rock, or coal on off-the-highway hauls, call on your Euclid distributor or write us direct if you prefer. A recommendation based on practical applications of Euclid equipment on similar jobs involves no obligation.

The EUCLID ROAD MACHINERY Co. · · · Cleveland 17, Ohio

EUCLID SELF-POWERED HAULING EQUIPMENT For EARTH . . ROCK . COAL . . ORE

YOU GET GREATER TONNAGE PRODUCTION OF UNIFORMLY SIZED COAL WITH THE . . .

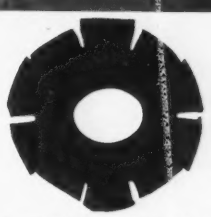


In this installation, nut coal at the rate of 150 T. P. H. is reduced to a product passing a 1" round opening screen.

★ An American Rolling Ring Crusher installed now will give you facilities that immediately reduce your crushing costs to less than one cent a ton including all costs. In making possible this low per-ton cost as the coal is split from bituminous lump coal to uniform stoker or pulverizer sizes, you increase tonnage and cut power costs.

Simplicity of construction and operation—accessibility at all times and real flexibility on the job all point to economy for you. External adjustment—compact design. Each unit arranged to meet the particular requirements of each installation.

Let us survey your requirements and make recommendations for crushing equipment for your specific purposes.



This splitting action of the SHREDDER RINGS shatters and distributes the coal before it reaches the Breaker and Grinding Plates.

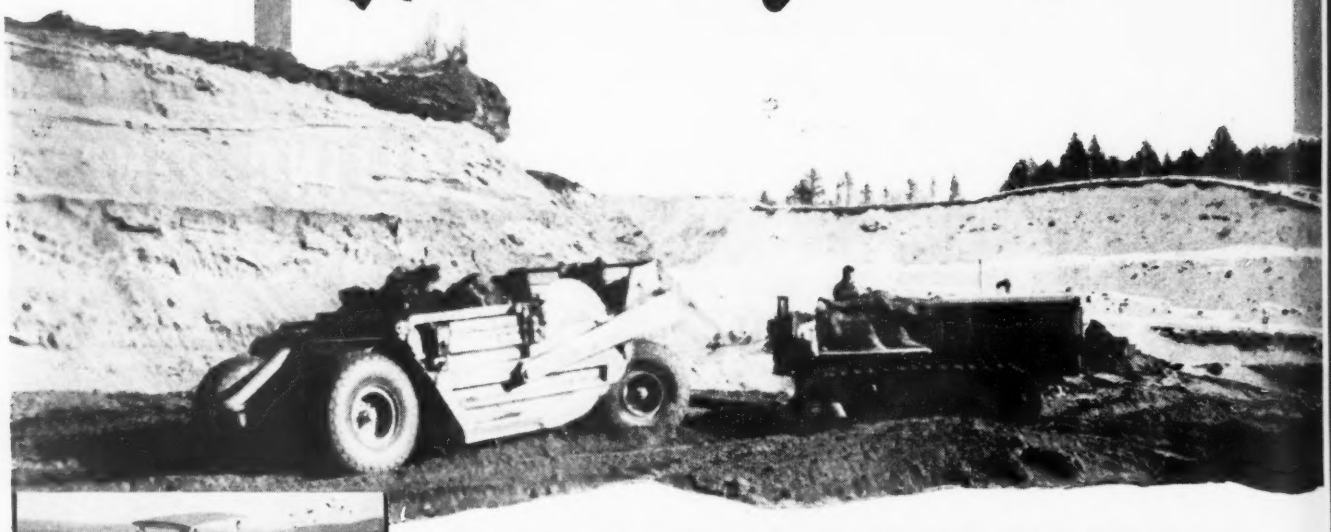
These patented reversible manganese steel SHREDDER RINGS are found only in the American Rolling Ring Crusher. They have twenty cutting edges or teeth and are designed to maintain their outward position by centrifugal force at the specified speeds. In contact with solid metal, the rings are momentarily deflected from their usual course because they are free to swing back out of position. There are no shear pins or other safety devices that require attention.

AMERICAN PULVERIZER COMPANY 1119 MACKLIND AVENUE ST. LOUIS, 10, MISSOURI

ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

SPEED UP STRIPPING OPERATIONS

This Easy Way!



When this Trailbuilder isn't busy pushing culm into hoppers, it is used for spotting cars, cleaning up around shovels and for general utility work around the mine.

Building a new road through rough mining country is a quick, easy job for this LaPlant-Choate hydraulic Trailbuilder—thanks to extra "down-pressure" on the blade.

USE LaPLANT-CHOATE "CARRIMOR" SCRAPERS TO OPEN LARGER PITS FASTER

More and more mine operators are discovering that in many cases the quickest, cheapest way to uncover valuable "pay dirt" is with LaPlant-Choate "Carrimor" scrapers. This is because "Carrimors" can strip larger areas of overburden . . . open larger pits . . . and dump waste material completely away from the pit, thus eliminating costly rehandling. Moreover, one thrifty "Carrimor" tractor combination handles the entire job—loading, hauling and dumping—so you save the extra expense of separate loading and hauling rigs. For more complete facts on this modern, low-cost method of stripping, see your LaPlant-Choate "Caterpillar" distributor, or write: LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

NEW DEVELOPMENTS COMING!

In the near future, LaPlant-Choate will announce a complete new line of cable and hydraulic-operated dozers and scrapers built exclusively for all sizes of "Caterpillar" track-type and rubber-tired tractors. These new LaPlant-Choate units will offer improvements never before dreamed of in the earthmoving industry. So better plan to buy LaPlant-Choate and get the better buy.

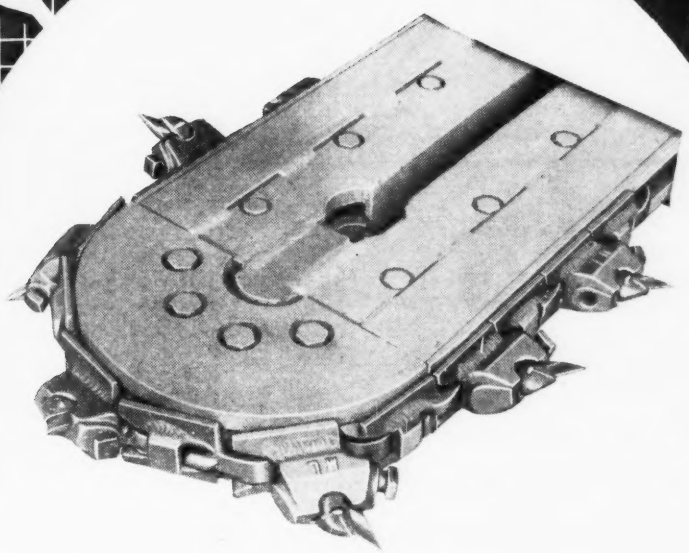
ARMY E NAVY

LaPLANT-CHOATE

Earthmoving and Land Clearing Equipment

BOWDIL COAL CUTTING EQUIPMENT

Watch your costs come down!



● Maximum coal production means little time out for equipment replacement or repairs. Assure high production and reduced costs with BOWDIL Coal Cutting Equipment.

Featured here is the BOWDIL CUTTER BAR. Check these important advantages!

SAVE TIME CHANGING BITS

(Chain couplings have been designed to make Bit replacement quick and easy thus saving man hours and reducing maintenance time.)

SAVE POWER

(The thin, compact design of the BOWDIL CUTTER BAR, plus its greater strength and rigidity, reduces power requirements . . . cuts more coal in less time.)

CUT THINNER KERF

(The thin design of the BOWDIL CUTTER BAR and BOWDIL BITS affords 30% more cutting surface to insure more *coal* and less "bug-dust".)

Investigate the BOWDIL combination—Bar, Bit and Chain—today! A letter will bring complete details.

ASK THE BOWDIL SALES ENGINEER TO SHOW YOU COST-CUTTING EXAMPLES

THE BOWDIL COMPANY • CANTON • OHIO

NOW IN PRODUCTION..

New Mack Trucks for Civilian Pool:

Because of urgent and mounting essential civilian needs, the War Production Board has authorized the manufacture of certain types of trucks for commercial use.

Assigned to Mack are models ranging from 9,000 pounds gross vehicle weight up to the largest off-highway vehicle. Production on some models has already started.

Military production continues, of course, in all Mack plants.

We will gladly give you detailed information. Just drop us a line, or phone.

Mack

TRUCKS
FOR EVERY PURPOSE
ONE TON TO FORTY-FIVE TONS

BUY U. S. WAR BONDS

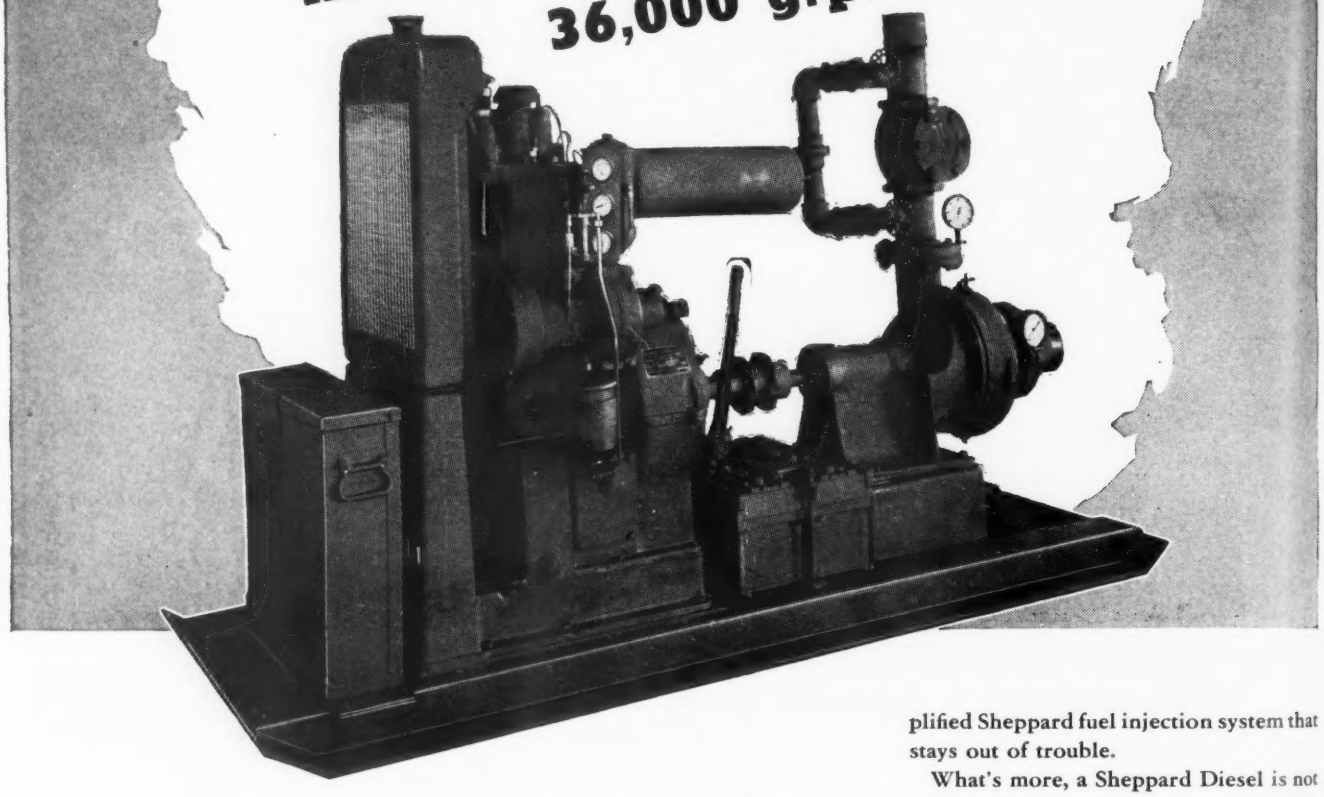
Mack Trucks, Inc., Empire State Building, New York, N. Y.
Factories at Allentown, Pa.; Plainfield, N. J.;
New Brunswick, N. J. Factory branches and dealers
in all principal cities for service and parts.

IF YOU'VE GOT A MACK, YOU'RE LUCKY...
IF YOU PLAN TO GET ONE, YOU'RE WISE!

THE FIRST INSTALLATION WAS PROFITABLE
so they ordered a
SECOND CHANCE
FLOTATION PROCESS!
The Consolidation Coal Company installed a Chance Sand Flotation Process to clean bituminous coal . . . and its efficient, economical operation led to the installation of a *Second* Plant! ★ This is typical of Chance repeat performances with a number of outstanding companies. ★ To solve your problems in cleaning bituminous coal . . . install a Chance Plant. For full information write us today.
UNITED ENGINEERS & CONSTRUCTORS, INC.
NEW YORK 17 ★ PHILADELPHIA 5 ★ CHICAGO 2

A BIG NICKEL'S WORTH OF DEPENDABLE POWER!

Sheppard Diesel Driven Allis-Chalmers Unit Pumps 36,000 g.p.h. for 5c



THE Sheppard Diesel 7-A Engine direct-connected to this Allis-Chalmers unit provides power to pump 36,000 gallons per hour with a 30 foot head. Fuel cost is 5c per hour. That's a lot of dependable power for a nickel!

This Sheppard Diesel reduces the cost of washing sand, coal, silt, oil field pumping operations. It is also ideal for standby fire protection. That's because complete dependability and readiness to go into action at any moment are assured by Sheppard Diesel's oil cooled pistons . . . hardened, replaceable cylinder liners . . . 4% governor regulation (closer if required) . . . and, especially, by the simplified Sheppard fuel injection system that stays out of trouble.

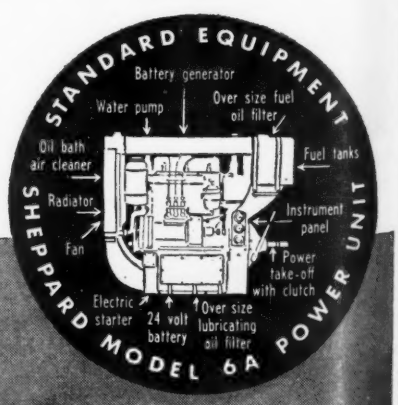
What's more, a Sheppard Diesel is not only ready to go into action at *any* moment—it's ready to go into action *the* moment you receive it. It's delivered complete. You need only add fuel and water and press the starter button.

And once you press the starter button on a Sheppard Diesel, you're on the way to learning how low in cost dependable power can be!

* * *

We, too, are busy trying to help end this war as speedily as possible. But the reconversion that lies ahead is an important problem and, like other thoughtful industries, Sheppard is planning for it. Sheppard engineers are ready to help you plan your post-war Diesel requirements now. To essential industries, a few Sheppard Diesels are available on priority. Write for information and illustrated data sheet on the Sheppard Model 7-A today.

R. H. SHEPPARD COMPANY, HANOVER, PA.



Sheppard

ALL AMERICAN DIESELS

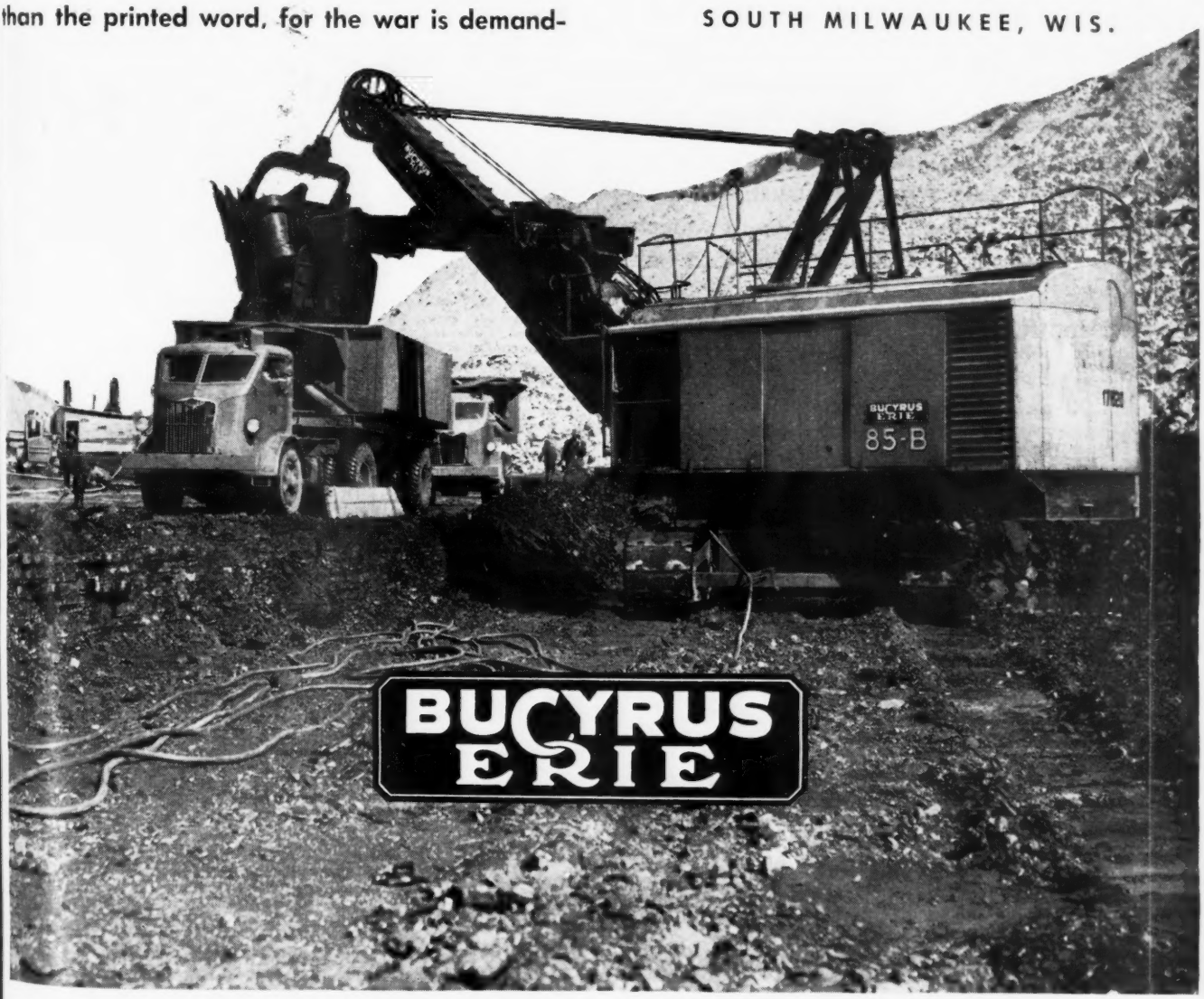
The PROOF of the PUDDING

Steady, top-speed performance . . . output that tops even the huge wartime requirements . . . costs reduced to a minimum . . . that's what Bucyrus-Erie excavators and drills are contributing to wartime coal production.

It's a story being told in terms far more vivid than the printed word, for the war is demanding exactly the kind of performance for which Bucyrus-Eries have been designed for years. The result of long intensive study of coal mining needs plus top notch engineering, Bucyrus-Erie "years ahead" design demonstrates daily its fullest value in speeding coal production.

That's why many coal mine operators are planning to include new Bucyrus-Eries in their equipment. They know that designed-for-the-job Bucyrus-Erie strippers, loaders, draglines, clamshells, blast hole drills, bit dressers, and tractor equipment will give them the low cost, big output performance they'll need. V-52

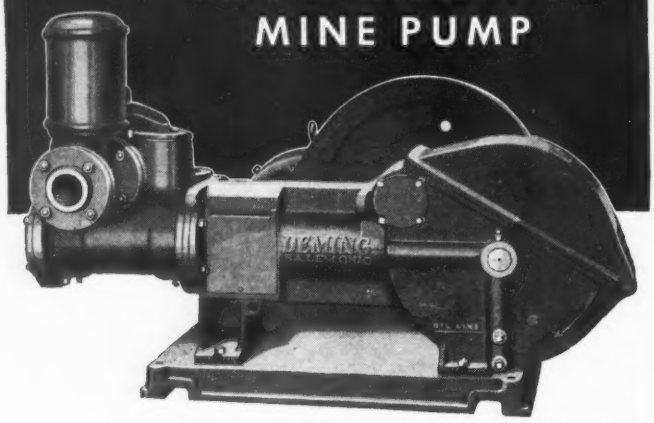
BUCYRUS-ERIE COMPANY
SOUTH MILWAUKEE, WIS.



DEMING

"Oil-Rite"

Figure 1896
DOUBLE-ACTING
MINE PUMP

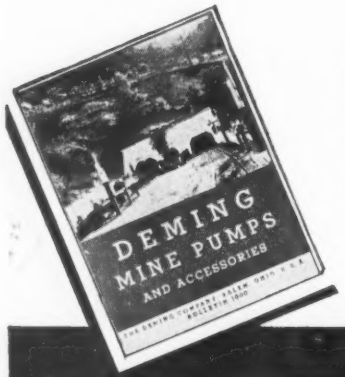


This heavy duty piston pump is well known in the mine field for its reliability in mine gathering service.

Water end is entirely separate and bolted to the power end. It contains all valves which are easily accessible without disturbing pipe connections. Standard construction of water end is cast iron with bronze liner. Can be furnished with all bronze or chromium iron water end for exceptionally bad conditions.

Made in 5 sizes with capacities from 1,000 to 6,000 gallons per hour.

THE DEMING CO. • SALEM, OHIO



Send for special Bulletin 1000 which contains important data on the complete line of Deming Mine Pumps and Accessories.

DEMING
Mine Pumps

The greatest help a coal mining man can have—

IF YOU want to make sure of getting your certificate of competency—sure of winning a bigger job with bigger pay, get Beard's great books today and put them to work for you.

In these three books you have a practical, always-on-the-job guide that will help you solve the problems you face every day, show you what to do, tell you why it should be done.

Beard's

Mine Examination Questions and Answers!

3 volumes — $7.50, payable in four monthly payments

THESE books explain what a man must know in order to become a mine inspector, a mine foreman, assistant foreman, fireboss, hoisting engineer, safety engineer, shot-firer, etc.

They give you complete and authoritative information about air and gases, explosives, safety requirements and methods, mechanics, engines, hoisting, drainage, pumping, ventilation, timbering, instruments, and every other detail that the practical mining man must know.

Can you answer these questions—

What is meant by splitting the air current and what are the advantages derived from such methods?

Can a miner live in air in which the oxygen content is reduced to 17 per cent?

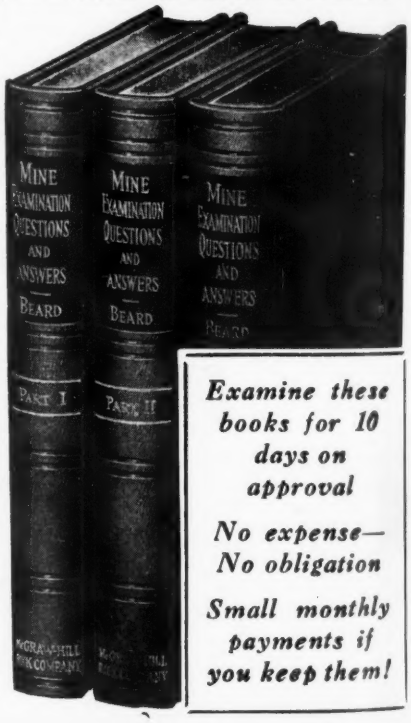
Name five duties imposed on mine foremen by law?

In what time can an engine of 40 effective hp. pump 4,000 cu. ft. of water from a shaft 360 feet deep?

What are the advantages and disadvantages of a gasoline pump, an air pump and an electrical pump?

What is the estimated tonnage per acre, per foot of thickness, for bituminous coal?

These are but a few of the more than 2000 questions given in Beard's books together with full correct answers. Hundreds of men have used this method to prepare for higher, better jobs. You can too, if you have the Beard books and plan to use them systematically. They are the best investment that a mining man can make—not only as an aid for passing examinations but as practical reference volumes on everyday mining operation problems.



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Small monthly payments if you keep them!

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Send me, charges prepaid, Beard's Mine Examination Questions and Answers, 3 volumes, for 10 days' examination. If satisfactory I will pay $7.50 at the rate of $1.50 in ten days and $2.00 per month. If not wanted I will return the three volumes postpaid.

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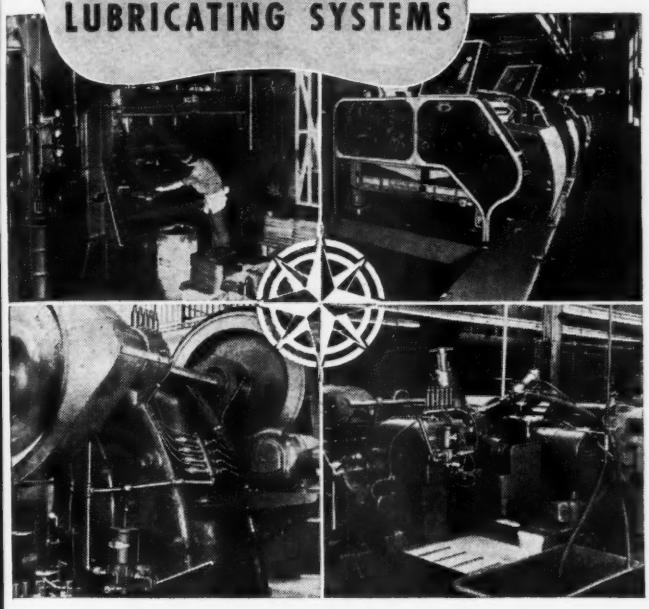
Address .....
City and State .....
Company .....
Position ..... C. 6-44

LINCOLN
CENTRO-MATIC LUBRICATING SYSTEMS



THE *Modern* WAY TO LUBRICATE ALL TYPES OF MACHINERY

The Lincoln *modern method* of centralized lubrication, makes it possible for all bearings on one machine, or a series of machines, to be lubricated from a central source without stopping the machines.

The Lincoln Centro-Matic System consists of a number of Centro-Matic Injectors—one for each bearing—and a hand-operated, or a power-operated Centro-Matic Lubricant Pump. The system is easy to install and will help increase your plant efficiency, not only today, but for years to come.

SPECIAL ENGINEERING SERVICE

Lincoln Engineering Company maintains a staff of specialized engineers who are prepared to assist you in solving your industrial lubrication problems without obligation to you. We invite you to avail yourself of this service.

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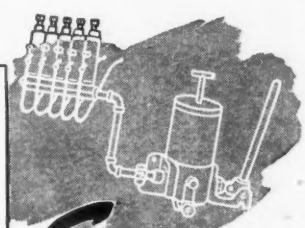


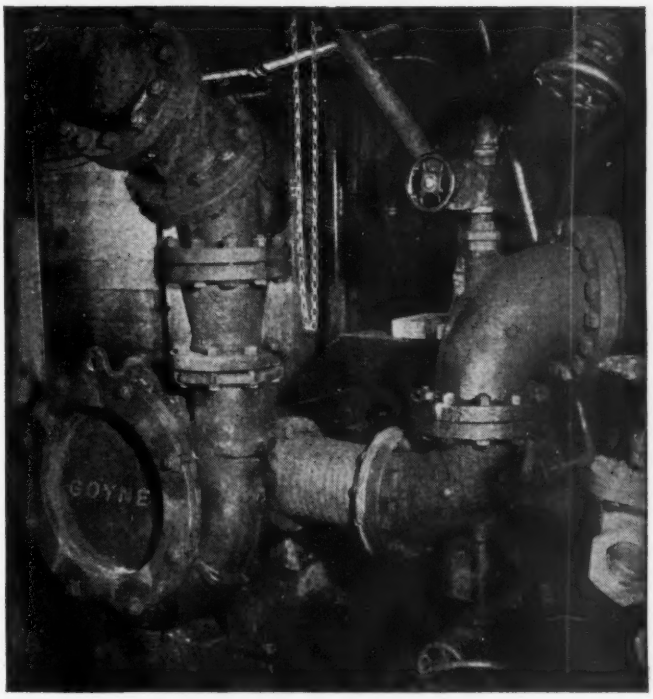
Save

MAN HOURS
MACHINE HOURS
BEARINGS • POWER
and reduce accidents

***Write* for Descriptive Literature Today**

LINCOLN ENGINEERING COMPANY
Pioneer Builders of Engineered Lubricating Equipment
[illegible] NATURAL BRIDGE AVE., ST. LOUIS 20, MO., U. S. A.

GOYNE PROCESS PUMPS



A Sand Pump is only a link in a chain in a coal washing plant, but it can be a strong link if it embodies the following features as does the Goyne:

1. Ease of inspection of all wearing parts. All internal portions are immediately accessible after removing only the rear head of the pump. No suction or discharge piping is disturbed.

2. The one packing box of the pump is subjected only to suction pressure and is readily kept clean by a low pressure clear water line. Long packing and shaft sleeve life is assured.

3. Impeller clearance is adjusted *while the pump is running*, insuring constant pump capacity so essential for uniform washing.

4. There are twenty-eight possible nozzle assembly combinations for each standard pump. Washery designers like this "adaptability feature" as it helps them out of tight places and simplifies piping.

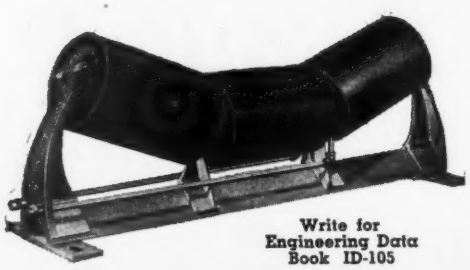
5. We carry the spare parts stock. Order your replacements when needed. Reduce your inventory by using Goyne Process Pumps.

All inquiries receive prompt and careful attention.

THE GOYNE STEAM PUMP CO.
ASHLAND, PA.

Haul It the Economical Way on CONTINENTAL Idlers

Belt Conveyors are one of the most economical and flexible systems for conveying bulk material. Continental's complete line of equipment combined with engineering "know-how" provides the means of realizing this economy. Send us your inquiries.



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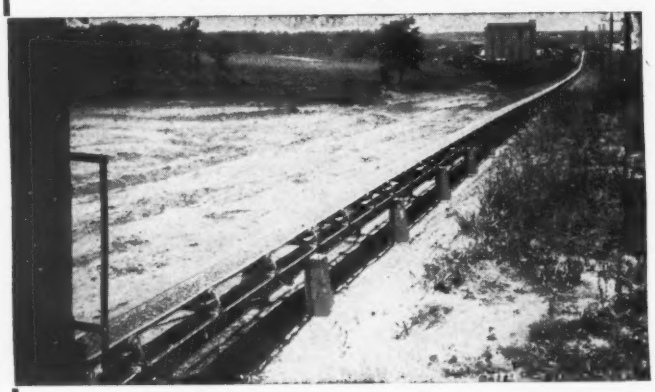

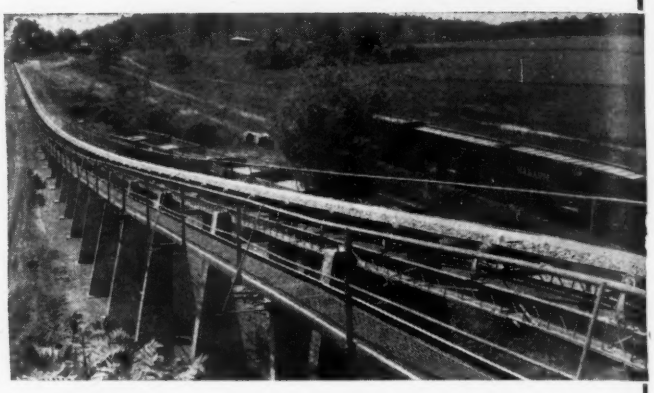

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SUTTON SAND DRYING STOVES

The Standard for Over Forty Years

Can Be Operated By Unskilled Labor

Today, when there's manpower shortage, it's important that your equipment is easy to operate—by anybody. That's an important feature of Sutton Sand Drying Stoves. Any worker about the plant can operate it to full capacity.

SUTTON FEATURES

- Made in four sizes to meet all conditions.
- Low original cost
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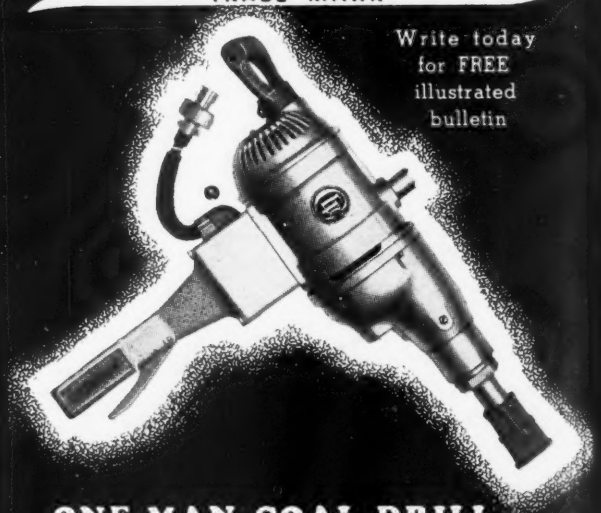

ONE-MAN COAL DRILL

. . . .lowers drilling costs because it is designed and constructed to give more power "pound for pound" and more drilling efficiency "day after day." Used successfully in drilling both anthracite and bituminous coal. Easy to operate. Sold with money-back guarantee. Write today.

THE CINCINNATI ELECTRICAL TOOL CO.

Division of The R. K. LeBlond Machine Tool Co.

2677 MADISON ROAD • CINCINNATI, OHIO

How to get peak coal production

from your mechanical-loading equipment

Here are the most efficient methods of using various types of loading machines, conveyors, scrapers, and certain special equipment, in the loading and handling of coal underground, now presented in a readable, thorough, and practical treatment.

Mechanical Loading of Coal Underground

By IVAN A. GIVEN
EDITOR, *Coal Age*

397 pages, 6 x 9, 222 illustrations, $4.00

THIS practical manual thoroughly discusses the various types of equipment used in slope-sinking, entry-driving, and development work, and in production of coal from the usual or regular working sections—details the methods suited to or used with the various types of equipment and under various seam thicknesses and natural conditions—tells how machines are best installed, where they can fill in for other types of equipment, what to do to get biggest production from equipment.

Included in this sound book are over 200 necessary maps, plans, and sketches, showing how methods described in the text are practically applied to actual working conditions. A liberal number of mining plans tested in given mines throughout the country are here, as well as the latest thought on face preparation, power supply, and maintenance.

Tells you:

—every possible way in which equipment can be used
—how to keep equipment in first-class running order
—what factors to consider in purchasing mechanical-loading equipment
—when a small investment in simple attachments saves the purchase of an entire new machine
—installation considerations for all equipment
—methods for increasing mining extraction etc., etc.

CONTENTS

1. Mechanical-Coal-loading Principles
2. Mechanical-Coal-loading Essentials
3. Types of Mechanical-loading Units, Characteristics, Crews, Unit production—Hand-loaded Equipment.
4. Types of Mechanical-loading Units, Characteristics, Crews, Unit Production—Self-loading Equipment
5. Slope-sinking and Development with Mechanical-loading Equipment
6. Conveyor-mining Plans
7. Scraper-mining Plans
8. Mobile-loader Mining Plans
9. Face Preparation
10. Power for Mechanical Loading
11. Maintenance in Mechanical Loading

McGRAW-HILL ON-APPROVAL COUPON

McGRAW-HILL BOOK CO., 330 W. 42 St., New York 18, N. Y.
Send me Given—Mechanical Loading of Coal Underground for 10 days' examination on approval. In 10 days I will send $4.00, plus few cents postage, or return book postpaid. (Postage paid on cash orders.)

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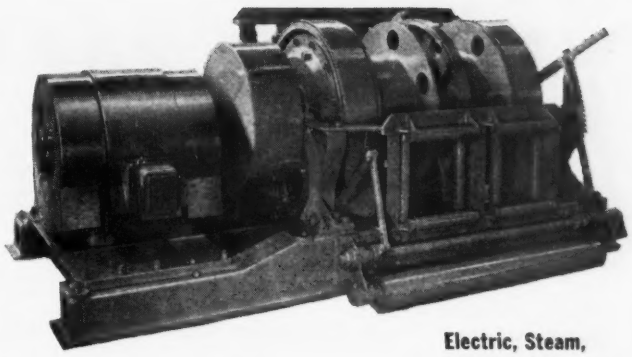
(Books sent on approval in U.S. and Canada only.)

VULCAN

HEAVY DUTY DENVER

Scraper Loaders

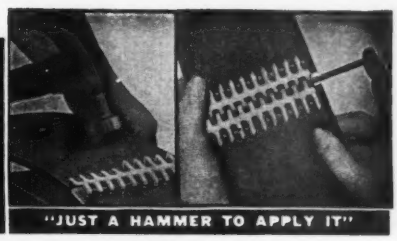


With 100 H.P. Continuously Rated Motors. Seventy in use at one property. Engineered for 60" to 72" scrapers. Steel construction; ball bearing thruout.

Electric, Steam, Diesel & Gasoline Hoists; Scrapers, Loaders, Conveyors, Skips, Cages, Sheaves.

VULCAN IRON WORKS CO
DENVER COLORADO

BELT LACING and FASTENERS for transmission and conveyor belts



"JUST A HAMMER TO APPLY IT"

ALLIGATOR

(Trade Mark Reg. U. S. Pat. Office

STEEL BELT LACING

World famed in general service for strength and long life. A flexible steel-hinged joint, smooth on both sides. 12 sizes. Made in steel, "Monel Metal" and non-magnetic alloys. Long lengths supplied if needed. Bulletin A-60 gives complete details.

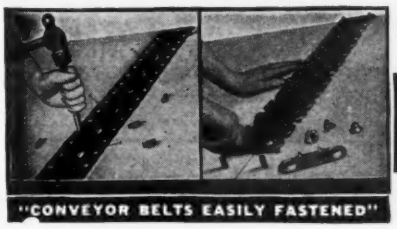
FLEXCO HD

BELT FASTENERS AND RIP PLATES

For conveyor and elevator belts of all thicknesses, makes a tight butt joint of great strength and durability. Compresses belt ends between toothed cupped plates. Templates and FLEXCO Clips speed application. 6 sizes. Made in steel, "Monel Metal", non-magnetic and abrasion resisting alloys.

By using Flexco HD Rip Plates, damaged conveyor belting can be returned to satisfactory service. The extra length gives a long grip on edges of rip or patch. Flexco Tools and Rip Plate Tool are used. For complete information ask for Bulletin F-100.

Sold by supply houses everywhere



"CONVEYOR BELTS EASILY FASTENED"

FLEXIBLE STEEL LACING CO.

4638 Lexington St.
Chicago, Ill.

YOU CAN'T AFFORD TO

SHADOWBOX

WITH THE PAPER-BOX PROBLEM!

NO, SIR. Or with any other angle of the paper conservation problem. Our boys need every bit of paper and paper board the Army can get to ship their precious invasion supplies in. And it's up to you and every other manufacturer to cut and cut and cut again on the use of paper and paper board.

For every time a convoy sets sail—that's so much more paper and paper board in action. And the supply, as you know, is diminishing.

So your job is to figure every known way, yes, and a few unknown ways, to USE LESS PAPER AND PAPER BOARD.

Don't worry about the public, your public, squawking about your cutting down. The big all-out national drive right now is selling the public on the necessity for paper conservation. They'll be with you.

The green light is yours. Step on it.

If your company and your community have not already started Paper Conservation Committees, why not get them started now yourself?

USE LESS PAPER BECAUSE

Paper vests have proved excellent for aviators and ground crews as cold protection.

Paper is used for disposable gun covers and ordnance wraps to protect such equipment while making invasion landings.

The Army supplies helmets of laminated fiber for non-combat duty in the tropics.

Many essential airplane parts are fabricated of plastic with a paper base.

Army trucks require 20 pounds of paper for safe delivery.

It takes 25 tons of blueprint paper to make a battleship.

USE LESS PAPER THESE WAYS

Review all printed forms periodically for essentiality; consolidation; elimination of waste space; standardization of sizes, weights, color, grade; elimination of color where possible.

Eliminate carton insert and/or directions when possible and substitute information on label.

Overhanging, extended or padded carton tops should be eliminated unless they can be justified in a critical paper shortage.

Use and re-use carbon paper consistently.

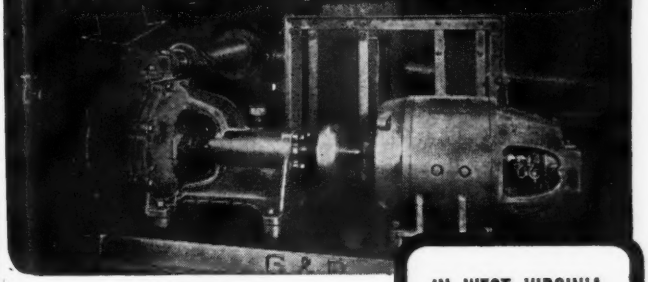
Consider the possibility of reducing the length and increasing the diameter of tubular products as a means of conserving folding and set-up boxes.

Let's All Use Less Paper

This advertisement prepared under the auspices of the War Advertising Council in co-operation with the Office of War Information and the War Production Board.

Space for this advertisement contributed by COAL AGE

it PUMPS 24 hours a day with no "shut downs"



The keynote of the dependable G & R Mine Gathering Pumps is the word "simplicity". Because of greater simplicity (only one moving part — the impeller), these Self-Priming Centrifugals will pump more water, more continuous hours, per dollar invested than any other type. No valves to clog; no cylinder liners to be cut out; no gears, cams, levers, etc., to wear, break, or cause trouble. Pumps operate at motor speed. Capacities up to 220 GPM; heads up to 125 ft. Our engineering department will survey your requirements and make recommendations or write for Bulletin MP-2. It's free.

See our catalog data in Coal Mining Catalogs

IN WEST VIRGINIA

the Koppers Company are replacing old pumps as they wear out with G & R self-priming centrifugal mine gathering pumps. At the Helen, Stanaford, Kimball, Stotesbury and Kopperstown Mines 36 G & R Pumps of varying capacities are daily proving their simplicity and dependability.

Distributors in all principal Mining Areas.

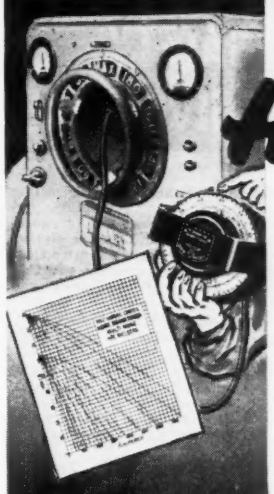
THE GORMAN-RUPP CO.
MANSFIELD, OHIO

GORMAN-RUPP PUMPS — UNSURPASSED FOR PUMPING FAST

PROMPT DELIVERIES

can now be made on most models of...

HOBART *Simplified* ARC WELDERS



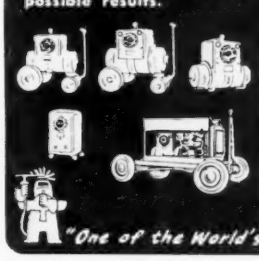
Mail Your Order with PRIORITY RATING at Once!

Right now is a good time to look to the future of your business and of your product. Every change you make today will have to be considered in the competitive field tomorrow. If you have enlisted the aid of Hobart welders to accomplish those changes and to stand behind them on the production line, you'll find your product in high standing. So turn to Hobart to keep your product up-to-date in design and performance, and production at the top of the ladder.

Hobart Brothers Co., Box CA-64

TROY, OHIO, U. S. A.

Reactance resulting from special design gives exceptional arc stability. Remote Control insures best possible results.



PLAN NOW for Post War with this new Service.

"Practical Design for Arc Welding," a remarkable service that shows you many ways in which you can use welding in redesigning your product.

Initial pages FREE!

"One of the World's Largest Builders of Arc Welders."

HENDRICK

Carbondale 1600

for

PERFORATED PLATE

Round—Square—Diagonal—Slot

Any perforation

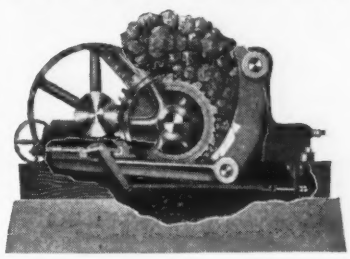
HENDRICK MANUFACTURING CO.

41 DUNDAFF ST., CARBONDALE, PA.

Sales Offices in Principal Cities

Please Consult Telephone Directory

BLACK DIAMOND COAL CRUSHERS



McLANAHAN BUILDS A TYPE AND SIZE FOR EVERY COAL CRUSHING REQUIREMENT! WRITE FOR DATA.

McLANAHAN AND STONE CORPORATION
ESTABLISHED 1835 HOLLIDAYSBURG, PENNA.

WOOD PIPE for Mine Drainage

Wyckoff Wood Pipe has an 89 year record of perfect resistance to the corrosive action of sulphurous mine water. It is an ideal, long-time investment—light, easy to lay, and relatively low in first cost.

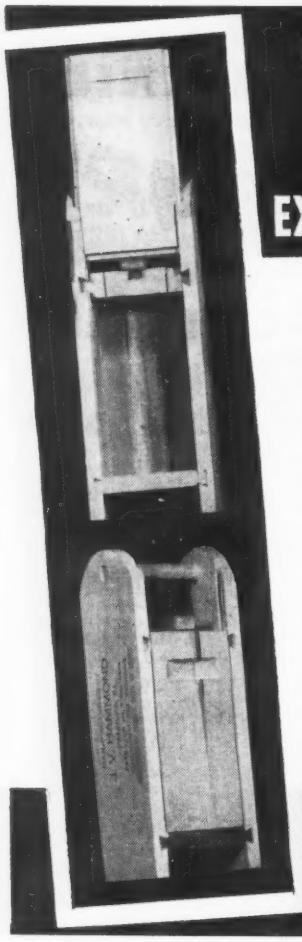
We also manufacture a special Hard Maple Pipe for flushing culm in the Anthracite Region and wood covering for underground steam lines.

Established 1855

Shipments from stock day after receipt of order. Send for catalog.

Emergency orders can be delivered by truck to mines in Pennsylvania coal fields following morning after receipt of same.

A. WYCKOFF & SON CO.
Office and Factory
No. 35 Home Street, Elmira, N. Y.
The Originators of Machine Made Wood Pipe



HAMMOND'S
Latest Type
SAFETY EXPLOSIVE BOXES

Approved by Penna. Dept. of Mines

Boxes are constructed entirely of wood, having no metal parts. They are of tongue-grooved and dovetailed construction, having handle for carrying, and are equipped with automatic lock using rubber bands for a spring.

NOTE: There are NO metal parts . . . conforming to regulations of the Penna. Dept. of Mines.

Important: Prompt deliveries of these Hammond products: safety explosive boxes — wood tamping poles — shovel handles — rope rollers — trolley poles. Order today or write for further details.

NET PRICES

Boxes Made in These Sizes:

No. 9	Powder Box	9 stick size	1.12
No. 12	Powder Box	12 stick size	1.27
No. 16	" "	16 " "	1.43
No. 20	" "	20 " "	1.58
No. 36	" "	36 " "	2.94
No. 72	" "	72 " "	4.23
No. 6	Detonator Box	2½x3x6 inside	1.01
No. 8	" "	2x2½x8 inside	1.01

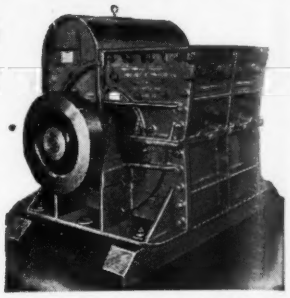
J. V. HAMMOND
SPANGLER, PENNA.

GRUENDLER CRAFTSMANSHIP
Serving Industry over 50 Years

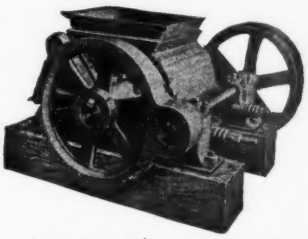
Master Builders of Coal Reduction and Sizing Equipment

For uniform coal sizes Lump, Egg, Nut, or Stoker

Primary crushing of Bituminous mine run coal to 4" minus, capacity 5 Tons per hour, with the Gruendler Ring Hammer Crusher.



Ring Hammer Primary Crusher with patented tramp-metal catcher.



Single Roll Secondary Coal Crusher

ROLL CRUSHERS
PULVERIZERS
CONVEYORS
CRUSHERS
FEEDERS
MIXERS

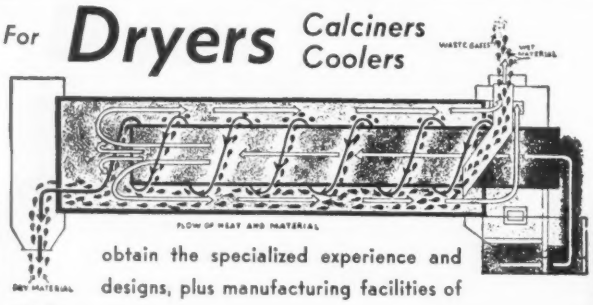
"Bulletin mailed on request."

GRUENDLER
CRUSHER and PULVERIZER CO.
2915-17 North Market St., ST. LOUIS (6), MO.

PERFORATED METAL
COAL MINING SCREENS
Manufactured exactly to your specifications
Any size or style screen, in thickness of steel wanted with any size perforation desired.
We can promptly duplicate your present screens at lowest prices.

CHICAGO PERFORATING CO.
2443 West 24th Place
CHICAGO, ILLINOIS
Canal 1459

For **Dryers** Calciners Coolers



obtain the specialized experience and designs, plus manufacturing facilities of

THE **L.R. CHRISTIE CO.**
17 E. 42nd St., New York 17, N. Y.

"Send us your problems—we would enjoy solving them."

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CLASSIFIED ADVERTISING

for bringing business needs or opportunities to the attention of men associated in administrative, executive, management, sales and responsible technical, engineering and operating capacities with the industries served by

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McGRAW-HILL PUBLISHING CO., INC.
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NEW ADVERTISEMENTS received by 10 A. M. June 27th will appear in the July issue subject to limitations of space available.

POSITION VACANT

OPERATORS WANTED, strip and deep mining coal, limestone and sandstone quarries, in central Pa. Thousand acres, strip coal and old mines, available for immediated operations, easily accessible to railroads, tipples etc. G. Edward Haupt, Owner-Manager, R. D. #3. Beffefonte, Pa.

POSITION WANTED

CIVIL ENGINEER, with strip mine experience in all engineering problems connected with strip mining. Capable of taking complete charge of engineering. Now employed. Draft exempt. PW-262, Coal Age, 520 N. Michigan Ave., Chicago 11, Ill.

Don't forget the

BOX NUMBER

When answering the classified advertisements in this magazine don't forget to put the box number on your envelope. It is our only means of identifying the advertisement you are answering.

WANTED

WANTED: Mining Engineer for large Mine in southern West Virginia. Must be capable of handling all engineering problems, including surveying, mapping, detail drawings, construction work, etc. Good conditions, good pay and splendid opportunity for right man. W-261, Coal Age, 520 N. Michigan Ave., Chicago, Ill.

FOR SALE

ONE MILLION C. M. armored, insulated, copper shaft or bore hole cable for 250 volts, direct current use. Green River Mine, South Carrollton, Ky.

FOR SALE or lease 4300 acres coal land located in Scott County, Tennessee. For details write Geo. E. Davis, Bristol, Virginia.

WE LOOK INTO THE EARTH

By using Diamond Core Drills. We drill for Limestone, Gypsum, Talc, Fire Clay, Coal and all other minerals.

PENNSYLVANIA DRILLING CO.
Drilling Contractors
Pittsburgh, Pa.

SPLENDID OPPORTUNITY FOR PRACTICAL MINING MEN AS

SALES - SERVICE ENGINEERS

To Represent Established Mining Tool Manufacturer

Leading manufacturer of Rock Drills needs additional men as regional representatives to cover major U. S. mining areas for sales and service now and postwar.

REQUIREMENTS ARE:

1. **Knowledge of mining methods and equipment.**
2. **Ability to meet and sell mine officials and operators.**
3. **Age in 30's or 40's, not subject to military service.**

Mining school graduates preferred, though this is not an essential requirement. Some sales experience would be helpful, but practical mining experience is of first importance . . . plus ability to work with and meet mines men. Positions pay straight salary and expenses. Applicants mail full details of education, experience and qualifications to:

RW-260, COAL AGE
520 N. Michigan Ave., Chicago 11, Ill.

WANTED

-TRANSFORMERS-

BOUGHT and SOLD

We have several thousand transformers in stock for prompt shipment, and invite your inquiries.

PIONEER TRANSFORMER REBUILDERS

We rewind, repair and redesign all makes and sizes.

One Year Guarantee

THE ELECTRIC SERVICE CO., INC.
"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
STATION M Since 1912 CINCINNATI 27, OHIO

WANTED

LARGE COAL ACREAGE

Corporation will pay cash for going coal stripping operation with large coal acreage or will purchase coal acreage and strip with our equipment. (Prefer area with upwards 5 million tons). State seam and thickness, analysis, amount of coal, height and type of overburden, proximity to railroad and other pertinent data.

BO-254, Coal Age
330 West 42nd St., New York 18, N. Y.

WANTED !

15—20 to 30 cu. yd. Dump Cars, drop-door type.

IRON & STEEL PRODUCTS, INC.
39 years' experience
13484 S. Brainard Ave., Chicago 33, Illinois
"ANYTHING containing IRON or STEEL"

IF there is anything you want
that other readers can supply—
OR . . . something you don't want—
that other readers can use—
Advertise it in the SEARCHLIGHT SECTION

WANTED

¾ to 4 yard

SHOVELS

2 to 8 yard

DRAGLINES

FRANK SWABB EQUIPMENT COMPANY
Hazleton, Pa. *Telephone 3906*

DIAMOND CORE DRILLING, for any mineral. More than sixty gasoline, steam and electric drills, suitable for any job. **OUR SPECIALTY—testing bituminous coal lands.** Satisfactory cores guaranteed. Prices very reasonable.

HOFFMAN BROS. DRILLING CO.
PUNXSUTAWNEY, PA. Est. 1902 Tel. 382

LOCOMOTIVES

Goodman: All 250 volts.
1—10 ton, 31-1-4-T.
1— 6 ton, 30B, 43" 1—5 ton.
1— 5 ton, W-1-2, 36".
2— 5 ton, 2600 K.
1— 6 ton, 33-1-4-T.
2— 8 ton, 32-1-4-T.

Westinghouse: All 250 volt.
1—4 ton, 902, 48" 1—13 ton, 102, 42"
1—904 c. 44" 500 volt. Also 906 motors.
1—10 ton, 915.
Bar steel frames 10 ton, 6 ton, and 4 ton.

G.E.: All 250 volt. 4 ton 1022, 44" as is
6 ton 803, 44", as is 5 ton 825, 44"
6 ton 823, 44" 8 ton 839 motors
6 ton 801
8 ton 839

Jeffrey: 6 ton, and 4 ton, all gauges, 250 volt
1—**Jeffrey** MH 100, frame only.

MINING MACHINES

Jeffrey, 35B and 4—28A, 250 V. 4—29B 29C with shearing head.

Goodman, 12A, 12AB, 12AA, 12G3A, 24B
1—12G3 250 volt and 2—112 DA, 500 volt.
2—Permissible Type 12CA. 6—112AA,
3—124AA.

Sullivan, CE7, CE9, CE10, CR10 Low Vein. CR5 for middle cutting.

SUBSTATIONS—275 volts, D. C.

2—200 KW **G.E.** Rotaries (600 volt)
1—200 KW **Ridgway** M.G. Set.
2—150 KW **West.** Rotary.
1—200 KW 1—100 K **Ridgway** M-G Sets.
1—100 KW **West.** M-G Sets.
2—100 KW **G.E.** Rotary.

SPARE ARMATURES

Jeffrey MH 110, MH 78, MH 73, 29B, 35B and 28A. **Goodman** 34B, 30B, 30C, 12A, 12AB, 12AA 33-1-4-T, 31-1-4-T. **General Electric** 801, 803, 819, 821, 825, 839. **Westinghouse** 904, 906, 102, 907, YR2, 115. Also 200 KW **Westinghouse Rotary Converter Armature,** 250 V. Bracket Type, 150 KW G.E. HCC Bracket Type, and 150 KW G. E. TC Pedestal Type.

AERIAL TRAMWAYS * HOISTS * PUMPS * MOTORS * TRANSFORMERS * BOND WELDERS * RESISTANCE * COMPRESSORS * DUMPS * SPEED REDUCERS FIELD FRAMES * ARMATURES * GOODMAN HYDRAULIC SHOVELS * MOTOR STARTERS AND CONTROLLERS—AC & DC * DROP BAR SUPPORTS (Gooseneck), 29B and 29C * MINING MACHINE TRUCKS * SWITCHBOARDS * CIRCUIT BREAKERS—AC & DC * CONVEYOR HOISTS * COAL CRUSHERS (double roll) 12"x16", single roll 24"x36", 36"x36" CONVEYOR HOISTS, 24"x24" and 18"x16" * TURBO-GENERATOR 500 K.W. 275 volt DC * ROPE & BUTTON CONVEYOR 400' long LATHES, SHAPERS * SWITCHES * AUTOMATIC CIRCUIT BREAKERS 250 volt 600 amps to 2000 amps * MANUAL CIRCUIT BREAKERS 600 amps to 3000 amps * HOISTS, overhead, AC, 3-60-440, 1 ton and 2 ton * CAR RETARDERS, Fairmont * 1 Clam shell bucket 1¾ cubic yard, 1—Figure 8 drum * MINE CARS 2 SULLIVAN BIT SHARPENERS * R.R. SWITCHES 85# to 100# HOISTS 5 HP AC and DC GENERATORS DC 250-275 volt, 30 KW to 100 KW. Also 50 KW 125 volt direct connected to steam engine. Goodman Scraper Loader.

GUYAN MACHINERY COMPANY, Logan, W. Va.

Mr. Operating Man:
Mr. Traffic Man:

Your own owned CARS!

Demurrage, Avoidable Labor Expense, Extra

What could *you* SAVE?

What increase in Production could *you* EFFECT?

Consider, also, benefits from MOBILE "Storage"!

Which of these cars could *you* use?

85, Hopper, Double, 50-Ton
10, Hopper, Side-Discharge, 50-Ton
7, Koppel, Side-Discharge, 24-Yd.,30-Ton
150, Refrigerator, 40-Ft., 40-Ton
16, Refrigerator, 36-Ft., 30-Ton
18, Ballast, Composite, 50-Ton
25, Box, 36-Ft., 40-Ton; Steel Ends
9, Dump, Western, Automatic, 20-Yd., 40-Ton
20, Dump, K & J Automatic, 16-Yd., 40-Ton
20, Flat, 40-Ft., 50-Ton
43, Gondola, Composite, 36-Ft. & 40-Ft., 40-Ton
30, Tank, 8000-Gallon, 40 and 50-Ton

All cars are priced to sell!

IRON & STEEL PRODUCTS, INC.
39 Years' Experience
13484 S. Brainard Ave., Chicago 33, Illinois

"ANYTHING containing IRON OR STEEL"

LATHES

36"x18' Schumacher Boye Triple Geared.
22"x10' LeBlond 3 S.C.D. Q.C.
26"x16' Pittsburgh, 3 S.C.D. Q.C.

SHAPER

20" Columbia Heavy Duty, Cone.

CINCINNATI MACHINERY & SUPPLY COMPANY
218 E. Second St., Cincinnati, Ohio

A DEPENDABLE SOURCE for HEAVY EQUIPMENT

CARS — CRANES — COMPRESSORS
DRAGLINES — LOCOMOTIVES
SHOVELS—TRACTORS—ETC.

WE WELCOME YOUR INQUIRIES

WE WILL FIGURE WITH YOU ON YOUR SURPLUS

B. M. WEISS CO.
Girard Trust Bldg. Phila, Pa.

MINING MACHINES

AC & DC

REBUILT & GUARANTEED FOR IMMEDIATE SHIPMENT

New Electric Coal Drills for AC and DC
Mine Fans, Tipple Scales, etc.
2—Ironton 5-ton Storage Battery Locomotives.

Equipment of all kinds

Buy, Sell or Exchange

THE INDUSTRIAL EQUIPMENT CORP.
Warehouse: Carnegie, Pa.
P. O. Box 1647 Pittsburgh, Pa.

1—220 HP. Sterling gasoline engine 120 KW. 550 volt DC generator, also available 250 volt DC, or AC.

ELECTRIC EQUIPMENT COMPANY
63 Curlew St. Rochester, N. Y.

FOR SALE

1—One **NORDBERG** Hoist No. 06392, 4 ft. drum, hydraulic brake direct connected 150 h.p., G.E. motor AC, 440 v. 3 ph. 60 cycle, speed 585, complete with panel board and ammeter.

3—One **POMONA** Vertical Pump, 75 h.p., AC, 250 v. 60 cy. 3 ph. Westinghouse motor, together with starting compensator, capacity 1000 gal. per min., 200 feet head.

4—One **ALLIS CHALMERS** Pump, type BS 13406, 100 h.p., motor AC, 200 v. 60 cy., 3 ph., capacity 1000 gal. per min., 250 feet head.

All of the above equipment in first class operating condition

FS-200, Coal Age
520 No. Michigan Ave., Chicago, Ill.

REBUILT EQUIPMENT—READY TO SHIP

AUTOMATIC RECLOSING CIRCUIT BREAKERS

1—300 Amp. 275 volts, type RBI, serial No. 6193.
1—400 Amp. 275 volt, type CRL, serial No. 6327.
1—400 Amp. 275 volt, type ARL, serial No. 7530.
1—600 Amp. Class I, type AHD, 275 v. Ser. No. 8051.

MINING MACHINES—250 v. DC

7—CE-7 Sullivan 36" ga. 1—Sullivan 5B Buddy.
2—Armatures for CE-7 Sullivan 250 v. D.C.
1—12 AA Goodman 250 v. 36" ga.

MINE LOCOMOTIVES

1—3½ ton Ironton Battery 36" ga.
5—5 ton Goodman 30 B, 250 v. 36" ga.
1—6 t. Atlas 4000# D.B.P. with AC or DC Mtrs. 36" ga.
2—7 ton Goodman 32-0-4-T 250 v. 36" ga.
1—10 ton Milwaukee Gasoline.
1—10 ton West. 500 v. 40" ga.
1—12 ton G.E.-53 500/550 v. 42" ga.

DIESEL ENGINE GENERATOR SET

1—75 KW, 250 v. DC, type SK Westg Gen. belted to 100 HP Buckeye Horiz. Diesel.

CENTRIFUGAL PUMPS

1—2500 GPM Allis Chalmers 95' hd.
2—1000 GPM Cameron bronze, 100' hd.
1—800 GPM Weinman 90' hd. 6 x 5.
1—100 GPM Dayton 46' hd. 1700 rpm.

MOTOR GENERATOR SET

150 KW Ridgeway 250 v. DC, 900 rpm., 2200/3/60, syn.

TRANSFORMERS—1 ph. 60 cy.

No	Kva	Pri	Sec	Make
1	100	2200	110/220	G.E.
3	100	6600	550/440/220	Pgh.
3	50	11430/6600	550	Al. Ch.
3	50	6600	575	G.E.
3	50	Westg.	4000/2200	230/460
1	37½	2300	220/440	Wagner
3	37	4400	185	West. (Rotary)
35	10	2200	110/220	G.E.
100	7½	2200	110/220	G.E.
75	5	2200	110/220	West.

SLIPRING MOTORS—3 ph. 60 cy.

HP	Make	Type	Volts	RPM
300	Westg.	CW-1106	2200	580
300	G.E.	2200	585	I-17B
300	G.E.	440	900	I
260	Burke	440	600	EMV-65
200	G.E.	2200	575	I-12
200	G.E.	2200	600	I
200	Westg.	220/440	580	CW
150	West.	2200	580	CW
150	G.E.	220	575	I-8
125	Fair Morse	440	1800	
100	G.E.	I	220	450
100	Westg.	CI	220/440	1750
100	Westg.	2200	900	CW
100	G.E.	2200	450	I-M
100	Westg.	220	720	CW-854
75	Cr. Wh.		220/440	875
75	Cr. Wh.	220	870	
75	G.E.	440	900	ITC
75	G.E.	440	1800	ITC-M

HP	Make	Volts	RPM	Type
75	Westg.	220/440	690	CW
75	G.E.	220	900	
62	Westg.	220/440	1135	
60	Triumph	C-16	220/440	430
60	Westg.	HF	2200	690
53	G.E.	I	220/550	1165
50	G.E.	440	900	MT-542
50	Chandeys'n	220/440	1800	
50	G.E.	220/440	1200	HI
50	Westg.	400	850	HF
50	Allis Chal.	220	490	
50	Westg.	440	1150	CW636A
40 to 50	Westg.	440	1150	CW
40	G.E.	220/440	720	MT542
30	Westg.	220	540	MW
20	G.E.	220	865	
20	Westg.	220	1735	CW
20	G.E.	220	1200	MT

230 V. DC MOTORS

HP	Make	RPM	Type
30	Westg.	1150	SK-110L
35	Westg	675	SK-140
125	Morg. Gardner	425	
150	G.E.	500	MPC-6
300	Otis	550	

(With spare armature)

COAL CONVEYOR

Link Belt Vertical Coal Conveyor, bucket type, approx. 80 ft. good for 100 RPM, hoists 25 TPH, all new buckets and gears complete with 20 HP AC motor.

INDUCTION MOTOR GENERATOR SETS

250 Volts Compound Wound, D C —3 Ph., 60cy Motors

KW	Make	RPM	AC Volts
2	Crocker Wheeler	1750	220/440
3	Westinghouse	1150	220/440
5	Allis Chalmers	1150	220/440

DUQUESNE ELECTRIC & MFG. CO., PITTSBURGH (6), PA.

ROTARY CONVERTERS

500 KW G.E. SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V., Transformers.
500 KW AL-CH SYN. 275 V. 60 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V., Transformers.
500 KW WEST. SYN 275 V. 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V., Transformers.
300 KW G.E. SYN 575 V. HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.
200 KW G.E. SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM, Bracket Type, 2300/4000 V. Transformers.
150 KW G.E. SYN. 275 V. HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.
150 KW WEST. SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM, Bracket Type, 2300/4000 V. Transformers.

MOTOR GENERATORS

200 KW G.E. IND., 600 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM, Manual Switchgear.
200 KW R.W. SYN., 275 V., 2300/4000 V., 3 Ph., 60 Cy., 900 RPM, 80% P.F. Manual Switchgear.

LOCOMOTIVES

13-T WESTGHE., 250 V., 908-C Mts., 36" Ga.
13-T GOODMAN, 250 V., 36-A Mts., 36"-42" Ga.
10-T WESTGHE., 250 V., 907-C Mts., 36"-44" Ga.
10-T WESTGHE., 500 V., 907-C Mts., 36"-44" Ga.
8-T WESTGHE., 250 V., 906-C Mts., 36"-44" Ga.
8-T WESTGHE 500 V., 906-C Mts., 36"-44" Ga.
8-T GEN. ELEC., 250 V., 839 Mts., 36"-48" Ga.
6-T WESTGHE., 250 V., 904-C Mts., 36"-48" Ga.
6-T Gen. Elec. 250 V., 823-A Mts. 36"-44" Ga.

Each unit listed above is owned by us and is available now for immediate purchase.

WALLACE E. KIRK COMPANY
Incorporated
501 Grant Building Pittsburgh, Pa.

SPOT CASH

For complete mines going out of business or from receivers in bankruptcy, administrators of estates, etc.

Frank J. Wolfe

FOR SALE

LOCOMOTIVES

2—15-ton Goodman
1—15-ton Jeffrey
1—15-ton Westinghouse
2—10-ton Goodman
2—8-ton Goodman
2—8-ton G. E.
3—8-ton Jeffrey
3—6-ton Goodman
5—6-ton G. E.

ABOVE LOCOMOTIVES COMPLETELY REBUILT

ELECTRIC HOISTS

1—1300 H.P. Double Drum, cylindro-conical drum, 900' of 1¼" rope, 2300 volt.
1—800 H.P. Allis-Chalmers Slope Hoist, 6000' of 1¼" rope.
1—500 H.P. Double Drum, 1600' of 1¼" rope, 2300 volt, Ward Leonard Control.
1—400 H.P. Slope Hoist, 8500' of 1" rope.

MISCELLANEOUS

2—Joy Elevating Conveyors.
10—Joy 5-BU Loading Machines.
3—Jeffrey L-400 Loading Machines.
3—Jeffrey 29-C Top Cutting Machines.
2—Sullivan CLU Track Cutters.
5—Sullivan CE-7, permissible type, Shortwall Mining Machines, 250 volt.

Mail us your inquiries!

COAL MINE EQUIPMENT SALES COMPANY
306-7 Beasley Building L. D. Phone - 34 Terre Haute, Indiana

MINE HOISTS

1—Ottumwa Band Friction 36" will coil 3500 ft. ⅞" rope. 125 HP Motor.
1—Lidgerwood Cone Friction 42" will coil 2500 ft. ⅞" rope. 100 HP Motor.
1—Vulcan Band Friction Two Drum 54" 150 HP Motor.
1—Flory-Keyed Drum 52" will coil 2000 ft. 1" rope. 150 HP Motor.
1—Vulcan Sliding Pinion 60" will coil 3500 ft. 1" rope. 200 HP Motor.
1—Lidgerwood-Cylindro Conical Shaft Hoist—275 ft. 1¼" rope. 300 HP Motor.
1—Vulcan-Cylindro Conical Shaft Hoist 350 ft. 1⅜" rope. 400 HP Motor.
1—Connellsville-Cylindro Conical Shaft Hoist 350 ft. 1½" rope. 800 HP Motor.

And other hoists to suit all mining conditions

Jones Mining Equipment Co.
541 Wood Street Pittsburgh, Pa.

★ MINING EQUIPMENT READY FOR DELIVERY ★

CUTTING MACHINES

1—50-HP. Goodman standard, 250 volt
1—28-A Jeffrey, 250 volt
1—28-A Jeffrey, 500 volt
1—29-B Jeffrey Arcwall, 250 volt
1—29-B Jeffrey Arcwall, with 29-C Motor, 250 volt
1—CE-7 Sullivan, 220 volt A.C.
1—35-A Jeffrey, 250 volt
A.C. Motors complete for Goodman standard and low vein machines.

MACHINE ARMATURES

Jeffrey 35-BB, 28-A, 35-20, 29-C, 35-L
Goodman 12-A, 12-AA, 12-AB, 212-AA, 124-AA

LOCOMOTIVES

10-Ton Jeffrey, 250 volt, 42 or 44" gage
10-Ton G.E., 250 volt, 48" gage
13-Ton Westinghouse, 250 volt, 48" gage
4-Ton Ironton, 250 volt, 44" gage, low vein
4-Ton Jeffrey, 250 volt, 44 or 48" gage

GENERATORS

9-KW. Westinghouse M-G set, 250 volt
62½-KW. G.E. Alternator, 220 volt with 100-HP. natural gas engine & accessories
100-GW. Westinghouse generator, type SK-180, 250 volt

MISCELLANEOUS

1—Link-Belt loading boom 42" wide, 35' long
1—Pan conveyor 26"wide, 44' long
1—F.g. 8 Incline rope drum
3—Goodman Duckbills comp.
Stationary motors, Transformers, Controllers, Starters and many other items.

LET US KNOW YOUR NEEDS—WE BUY, SELL, AND TRADE

ALL-STATE EQUIPMENT CO. INC.
LOGAN, W. VA., PHONE 884

PROMPT SHIPMENT FROM OUR WAREHOUSE

MINING MACHINES

5—12 DA 50 HP 250 v. Goodman Shortwall
36 B Jeffrey 250 v. Low Vein #14318
CE 7 Sullivan 250 v. DC
2—35 LC Jeffrey AC Low Vein Machines 220/440 v. 3 ph. 60 cy. 1¼' bars without trucks. #23705-23706

STORAGE BATTERY LOCOMOTIVES

2—6 Ton G.E. Permissible Locomotives 36/44" Ga. O.S. armorplate frame. Inside steel tired wheels, 2-HM 825 Ball Bearing Motors. Type LSBE Class 2C6 From C9. 13½' long, 50" high, 69" wide and 44" Wheel base.

Each of the above units equipped with Edison Battery 80 cell A-10—one new in 1940, the other in 1939.

3—5 to 5½ Ton Type D Ironton, 36 or 42" Ga. Low Type.
1—4 Ton Jeffrey 42 or 44" Ga. with 2 MH 108 Ball Bearing Motors, Battery Box on top of locomotive.
1—5 Ton Atlas 40" or 44" Ga. with 2 Ball Bearing Motors. Battery box on top of locomotive.
1—5½ Ton Jeffrey 36" Ga. with 49 cell 23 plate New Exide Ironclad Battery.
4 Ton 36" Ga. Atlas.

(Haulage)

10 Ton Jeffrey with 13 Ton Equipment O. S. armorplate frame, inside new steel tires, 2 MH 110 Ball Bearing Motors, 36/42" Ga. completely rebuilt.
13 Ton Westgh. 250 V. 36" or 40" Ga.
1—5 Ton West. 250 V. 36 or 42" Ga. with Electric Gathering Reels. Bar steel frame.
6 Ton Baldwin West. 250 v. 36/42" Ga. #48747 904 Motors outside bar steel frame, inside steel tired wheels.

SCREENS

2—4' x 5' single deck Tyler Hummer Screens Type 37 equipped with V-16 Vibrators No. 2860 and 2867 designed for 110 v. AC 15 cy.

MG SETS 3 ph. 60 cy. (Syn.)

150 KW G.E. 250 v. —2200/3/60 900 RPM.
150 KW Ridgway 250 V. DC 2200 V. AC 900 RPM.
100 KW Ridgway 250 V. DC—2200 V. AC 1200 RPM.
75 KW 250 v. G.E. Type DLC G.E. opd. wd. interpole Gen. dir. con. to G.E. 100 HP Induction Motor 220 or 440 v. 3 ph. 60 cy. 1160 RPM with Starter and DC Panel.

AIR COMPRESSORS

492 cu. ft. 100#C hg. Pneumatic straight line heavy duty Diesel oil driven Compressor unit.

ENGINE GENERATOR SETS

100 KW 250 V. DC Westgh.—Skinner Engine.
50 KW West, 125 V. DC—Skinner Engine.

SLIP RING & SQ. CG. MOTORS (3 ph. 60 cy.)

HP	Make	Speed	Wdg.	Type
500	G.E.	450	S.R.	MT 412
200	G.E.	250	S.R.	MT 412
200	G.E.	600	S.R.	I-M
125	Al. Ch.	435	S.R.	
100	G.E.	500	S.R.	MI-25 cy.
100	Al. Ch.	575	S.R.	
100	West.	900	S.R.	CW.
100	G.E.	1200	S.C.	

PUMPS

250 GPM 250# or 575' Head 2 cyl. Hor. National Transit 6" suc. 4" dis. enclosed driven by 40 HP Motor.

HOISTS

1500 HP Shaft hoist including flywheel MG set operated on 2200 volt 3 phase 60 cycle
500 HP Connellsville Sgl. drum slope Hoist complete with AC Motor and contactor control.
75 HP Lidgerwood sgl. fr. drum
50 HP Diamond 2 drums same Shaft
30 HP Clyde sgl. drum AC Motor
30 HP Double drum—Tandem
15 HP Lidgerwood sgl. dr. AC Motor

400 TRANSFORMERS (Westgh. & GE 1 ph.)

Qu.	KVA	Pri. V.	Sec. V.
40	5	2080/2200	115/230
31	7½	"	"
28	10	"	"
2	25	2200	244/488
3	50	22000	2200
3	75	2200	110/220
3	75	2200	220/440

AC AIR BREAKERS (unused)

8—200/400 amp. 3 pole ITE 220 v.
2—300/600 amp. 3 pole ITE 220 v.

COAL CRUSHERS

24" x 30" Penna. single roll Heavy duty coal crusher.
18" x 24" Double roll New.
18" x 30" Double roll New.

SYNCHRONOUS MOTORS

HP	Make	Voltage	Speed	Type
220	G.E.	2200	600	ATI
200	West.	2200	900	
150	G.E.	2200	900	ATI

Each of the above has a dir. con. exciter.

MOORHEAD-REITMEYER CO., INC.

PITTSBURGH, PENNSYLVANIA

ELECTRIC LOCOMOTIVES

1—8 ton Goodman steel frame, 250 V. Type 3104-T, 42" gauge.
1—6 ton Jeffrey, with MH-88 250 V motors and reel.
1—6 ton West, bar steel frame with 904-C 250 V motors.
1—5 ton G. E. ready to operate, 42" ga.

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1—29LE Jeffrey 250 V, T.O.H. arcwall.
1—29C Jeffrey 250 V, arcwall.
1—12DA Goodman, 50 HP, 210 V, D.C. shortwall.
1—12G3 Goodman shortwall, 3/60/220 V.
1—12AB Goodman shortwall, 250 V, D.C.
1—36B Jeffrey 250 V, longwall.

MOTORS AND GENERATORS

1—100 KW West. compound wound D.C. generator, 250 V.
1—100 KW Rotary Converter, 275 V D.C. with 2300-4000 V transformers.
1—600 HP Allis-Chalmers Syn. 3/60/2200 V.
1—165 HP G. E. Syn. 2200 V, 900 RPM.
1—100 HP Crocker-Wheeler Syn. 220 V.
1—15 HP G. E. ball bearing, 3/60/220-440 V.
1—15 HP Allis-Chalmers, same as above.
1—7½ HP West, same as above.
1—5 HP, G. E. same as above.
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1—24"x24" double roll coal crusher
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1—Turbo Generator 110 KVA, 240 AC, 3 phase, 3600 RPM Turbine, Allis Chalmers Generator
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1—Blaw Knox Dreadnaught 1¼ Yd. clam shell bucket

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Stock parts for Marion 300 Loading Shovel
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940 CFM Ingersoll Rand 10 horiz. 3-st. steam driven with receiver

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#3 McCully Gyratory #6 McCully Gyratory

HOIST MOTORS

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2—37 H.P. Otis Elevator, Type 90219, 1140 RPM 3/60/440
4—40 H.P. G.E. Type MTC 5522, 1200 RPM, 3/60/440
1—50 H.P. Thomas Elevator, Type 1-12-35 Form M, 600 RPM, 3/60/440

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Marion Model 37 Steam Shovel, 1¾ yds.
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Lorain 30 Shovel, Crane & Backhoe
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Bay City ½ yd. Shovel
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Cletrac FD Tractor with Bulldozer & Scraper
Scraper-Wagon, Heil 12 yard
TD9 Tractor with bulldozer
Allis Chalmers "30" Tractor with bulldozer
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Gyratory Crusher, Traylor Type T, 12"
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National 100 H.P. dbl. drum Dragline Hoist, elec.
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American 45 ton Saddle Tank Switcher
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4—6 ton Goodman 42 ga.
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10 ton Goodman 42 ga. & 13 ton Jeffrey

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42"	5	1/8"	1/16"	20"	4	1/8"	1/32"
36"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	6	1/8"	1/16"	16"	4	1/8"	1/32"
30"	5	1/8"	1/16"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"
24"	4	1/8"	1/32"				

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16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

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	25 "	6.25
1¼"	50 "	12.00
	25 "	7.50
	35 "	10.50
	40 "	12.00
1½"	50 "	15.00
	25 "	10.00
	35 "	14.00
	50 "	20.00

AIR HOSE

I.D. Size	Length	per Length	Couplings
½"	25 feet	$5.00	$1.50 Pair
	50 "	10.00	1.50 "
¾"	25 "	6.25	2.50 "
	50 "	12.50	2.50 "
1"	25 "	10.00	3.50 "
	50 "	20.00	3.50 "

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COAL AGE ADVERTISERS IN THIS ISSUE

An asterisk preceding manufacturer's name indicates detailed information may be found in the 1943 *COAL MINING CATALOG*

*Air Reduction Sales Corp. 155
Allen & Garcia Co. 36, 37
Allen-Sherman-Hoff Co. 111
*Allis-Chalmers Mfg. Co. 8, 9
Allis Co., Louis The
Insert between pp. 128, 129
*American Cable Div. of American Chain and Cable Co. . . . . Third Cover
American Crucible Products Co. . . . 148
*American Mine Door Co. 158
*American Pulverizer Co. 177
*American Steel & Wire Co. 45
Anaconda Wire & Cable Co. 125
Atlas Powder Co. 46

Baker Mfg. Co. 139
Bemis Bro. Bag Co. 128
*Bethlehem Steel Co. 33, 123
Bituminous Coal Institute 48
*Bixby-Zimmer Engrg. Co. 154
*Bowdil Co. 179
Bristol Co. 158
Broderick & Bascom Rope Co. 60
*Brown-Fayro Co. 133
Bucyrus-Erie Co. 183

Carboloy Co., Inc. 138
Cardox Corp. 31
*Central Mine Equipment Co. 7
*Centrifugal & Mechanical Industries, Inc. 105
Chicago Perforating Co. 190
*Chicago Pneumatic Tool Co. 57
Christie Co., L. R. 190
*Cincinnati Electrical Tool Co. 185
*Cincinnati Mine Machinery Co. . . . 118
*Continental Gin Co. 186
Crane Co. 20
Cummins Engine Co. 61

*Deister Concentrator Co. 142
*Deister Machine Co. 146
DeLaval Steam Turbine Co. 144
Deming Co. 184
*Differential Steel Car Co. 145
Dings Magnetic Separator Co. 174
duPont de Nemours & Co., E. I. (Explosives Dept.) 129
duPont de Nemours & Co., E. I. Grasselli Chemical Dept.) 30

*Edison Storage Battery, Div. of Thos. A. Edison, Inc. 53
*Electric Storage Battery Co. 103
Ensign-Bickford Co. 64
Euclid Road Machinery Co. 176

Flexible Steel Lacing Co. 187
*Flocker & Co., John 156

Galigher Co. 144
Gardner-Denver Co. 173
Gates Rubber Co. 6
*General Electric Co. 38, 39
Goodman Mfg. Co. 16, 17
Goodrich Co., B. F. 1
*Gorman-Rupp Co. 189
Gould Storage Battery Co. 18
*Goyne Steam Pump Co. 185
*Gruendler Crusher & Pulverizer Co. 190
Gulf Oil Corp. 115
Gulf Refining Corp. 115
Guyan Machinery Co. 154

Hammond Co., J. B. 190
*Hardinge Co. 56
Harnischfeger Corp. 44
*Hazard Insulated Wire Works. 175
Hendrick Mfg. Co. 189
Hercules Powder Co. 121
Hobart Bros. Co. 189
Holmes & Bros., Robert. 131
Hulburt Oil & Grease Co. 2, 3

*Indiana Foundry Co. 186
I.T.E. Circuit Breaker Co. 26

*Jeffrey Mfg. Co.
Insert between pp. 20-25
*Joy Mfg. Co. 62, 63

*Keystone Electric Co. 149
Koehler Mfg. Co. 127
Koehring Co. 41

LaPlant-Choate Mfg. Co. 178
*Laughlin Co., Thos. 140
*Leschen & Sons, Rope Co., A. 147
Lima Locomotive Works, Inc. 51
Lincoln Engineering Co. 185
*Link-Belt Co. . . . . Fourth Cover
Lombard-Governor Corp. 150

Macmillan Petroleum Corp. 137
Mack Trucks, Inc. 180
Macwhyte Co. 167
Marlo Co. 162
Mayfair Hotel 162
McGraw-Hill Book Co. 184, 187
McLanahan & Stone Corp. 189
*McNally-Pittsburg Mfg. Co.
Insert between pp. 40-45
*Merrick Scale Mfg. Co. 160
Mine Safety Appliances Co. 135
*Mining Safety Device Co. 153
Morrow Mfg. Co. 59
Mosebach Elec. & Supply Co. 156
*Mott Core Drilling Co. 162
*Myers-Whaley Co. 25

*National Malleable & Steel Castings Co. 152
*National Powder Co. 40
Naylor Pipe Co. 132
*Norma-Hoffman Bearings Corp. . . 169

Ohio Brass Co. 27
Osmose Wood Preserving Co. of America, Inc. 14

Paris Mfg. Co. 148
Pennsylvania Crusher Co. 164
Philco Storage Battery Div. 4
*Pittsburgh Knife & Forge Co. 162
Pomona Pump Div., Joshua Hendy Iron Works 143
Post-Glover Electric Co. 152
Pressed Steel Car Co., Inc. 134
Prox Co., Inc., Frank 161

*Robins Conveyors, Inc. 157
Rochester Ropes, Inc. 29
*Rockbestos Products Corp. 165
*Roebling's Sons Co., John A. . . . 15, 136
Rome Cable Corp. 50
*Ruberoid Co. 170

S K F Industries, Inc. 171
Salem Tool Co. 160
*Sanford-Day Iron Works Co. . . . 10, 11
*Schramm, Inc. 130
Searchlight Section 191, 195
Sheppard Co., R. H. 182
Sinclair Refining Co. 28
Socony-Vacuum Oil Co. 109
Standard Oil Co. (Indiana) 32
Stearns Magnetic Co. 160
Stephens-Adamson Co. 35
*Sturtevant Mill Co. 126
*Sullivan Machinery Co. 54, 55
Sun Oil Co. . . . . Second Cover

Texas Co. 12, 13
Thermoid Co. 141
Thornton Tandem Co. 159
*Timken Roller Bearing Co. 113

United Engineers & Constructors, Inc. 181
*United States Steel Subsidiaries. . . . 45
United States Rubber Co. 49, 117
Upson-Walton Co. 19

*Vulcan Iron Works. 47
Vulcan Iron Works (Denver) 187

Walter Motor Truck Co. 107
Walworth Co. 58
Warren Steam Pump Co. 166
*Weir-Kilby Corp. 146
Westinghouse Air Brake Co., Ind. Div. 52
*Westinghouse Elec. & Mfg. Co. . . . 34
*W. Va. Steel & Mfg. Co. 168
*Wickwire Spencer Steel Co. 163
Wood's Sons Co., T. B. 172
Wyckoff & Son Co., A. 189

■

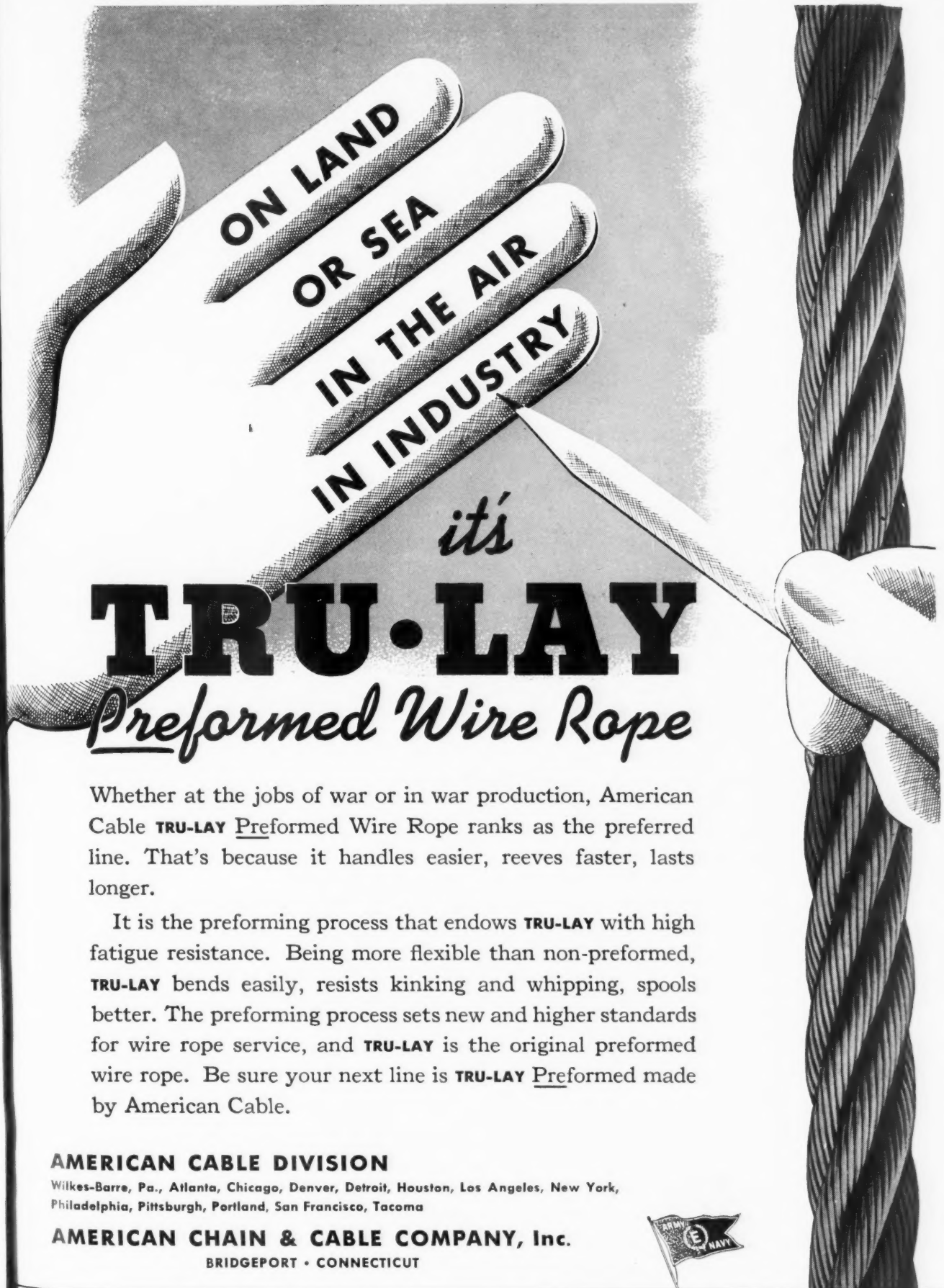
PROFESSIONAL SERVICES 164

■

SEARCHLIGHT SECTION

Classified Advertising

BUSINESS OPPORTUNITIES 191
CORE DRILLING 191
Hoffman Bros. Drilling Co. 191
Pennsylvania Drilling Co. 191
EMPLOYMENT 191
WANTED TO PURCHASE 191
USED AND SURPLUS EQUIPMENT 191-195
All State Equipment Co. Inc. 193
Baton Coal Co. 194
Bradford Supply Co., Inc. 195
Bryant, Leslie E. 195
Carlyle Rubber Co., Inc. 195
Cincinnati Machinery & Supply Co. 192
Coal Mine Equipment Sales Co. 193
Corson Inc., G. & W. 195
Crawbuck Co., John D. 195
Duquesne Electric Mfg. Co. 193
Electric Equipment Co. 192
Electric Service Co., Inc. 191
Foster Co., L. B. 194, 195
Frank, M. K. 195
Greensburg Machine Co. 194
Greenspon's Son Pipe Corp., Jos. 195
Guyan Machinery Co. 192
Industrial Equipment Corp. 192
Iron & Steel Products, Inc. 191, 192, 194
Jones Mining Equipment Co. 193
Kirk Co., Inc., Wallace E. 193
Moorhead Reitmeyer Co. 194
Stanhope Inc., R. C. 195
Swabb Equipment Co., Frank 191
Tippins Machinery Co. 194
Walsh Co., Richard P. 194
Weiss, B. M. 192



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1. What should be done to assure greatest uniformity of output?
2. What should be done to achieve highest overall production efficiency?
3. What should be done to insure production at lowest possible cost?

Thus you have a *quality necessity* so as to bring demand for your product—an *efficiency need* so that you can take out the maximum in tonnage per manhour—a *low-cost production requirement* so that you can keep in line with the overall market picture and still make a satisfactory profit.

The post-war situation is now bringing all this to the attention of the entire field in a more emphatic way than *possible ever before.* New war-created demands for uniformly prepared coals are making the establishment of greater coal preparation facilities a necessity. Even before the war, the growth in demand for stoker sizes and greater mechanization underground made modernization of preparation facilities so important.

Coal can share in post-war prosperity—markets are already made—new ones are certain to develop. To lay full plans for unlimited selling *now* is the best way to prepare for this new era that lies immediately ahead.

The Link-Belt organization has been on the alert for years in the development of a complete line of coal handling, sizing, cleaning, crushing, and drying equipment. We are ready now to cooperate with you in your plans for thorough mechanizing from mine throughout the preparation plant.

LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 19, Wilkes-Barre, Huntington, W. Va., Denver 2, Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4, St. Louis 1, Seattle 4, Toronto 8, Vancouver

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CONVEYING . . . CLEANING . . .
COMPLETE PREPARATION EQUIPMENT